UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
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16188

FEB 10 1998

REPLY TO THE ATTENTION OF:
R-19J

Russell J. Harding, Director
Michigan Department of Environmental Quality
P.O. Box 30473
Lansing, Michigan 48909-7973

Dear Mr. Harding

I am pleased to send you the executed signature page for the King Highway Landfill Record of Decision (ROD). I would like to thank you and your staff for the tremendous effort involved in developing this document, which represents a significant step in addressing contamination at the Allied Paper/Portage Creek/Kalamazoo River Superfund Site.

As you are aware, in order to concur with the remedy decision of this ROD, U.S. EPA was required to grant a waiver under the Toxic Substances Control Act (TSCA). Because U.S. EPA believes strongly that all of TSCA's requirements for chemical waste landfills are usually required to ensure adequate protection of human health and the environment, such waivers are rare. In order to verify that, as designed and constructed, the remedy selected for the KHL operable unit "will not present an unreasonable risk of injury to health or the environment from PCBs"--a determination required by TSCA--I am requesting that the following documents be submitted for review and approval by the Region V Toxics Program Section before implementation by the responsible parties:

- sampling and monitoring plan or plans;
- design plans for flood protection and erosion control;
- design plans for excavation, consolidation and dewatering; and
- operation and maintenance plans.

U.S. EPA staff will ensure thorough and timely review of these documents.

We look forward to working with your Agency in the future to further address the problems at the Allied Paper/Portage Creek/Kalamazoo River Superfund Site.

Sincerely yours,

David A. Ullrich
Acting Regional Administrator

# DECLARATION
## SELECTED REMEDIAL ALTERNATIVE
## FOR THE KING HIGHWAY LANDFILL - OPERABLE UNIT 3 OF THE ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER SUPERFUND SITE
## CITY OF KALAMAZOO, MICHIGAN

### Statement of Basis and Purpose

This decision document presents the selected remedial action (RA) for the King Highway Landfill-Operable Unit 3 (KHL-OU 3) and the Georgia-Pacific former lagoons 1, 2, 3, 4, and 5, (five former lagoons) of the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund site (site). The KHL-OU 3 includes the King Highway Landfill (KHL), the King Street Storm Sewer (KSSS) floodplain, and the stretch of the Kalamazoo River adjacent to the KHL. The KHL-OU 3 and the five former lagoons are located in the city of Kalamazoo, Michigan. The remedy was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 1980 PL 96-510, as amended by the Superfund Amendments and Reauthorization Act of 1986 and, to the extent practicable, the National Oil and Hazardous Substances Contingency Plan. This Record of Decision (ROD) addresses the five former lagoons and the KHL-OU 3 which is one of four Operable Units at the site. This decision is based on the administrative record for the KHL-OU 3 and the five former lagoons.

### Assessment of the Site

Actual or threatened release of hazardous substances from the KHL-OU 3 and the five former lagoons, if not addressed by implementing the response action in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

### Description of the Selected Remedy

This remedy is intended to be the final action for the five former lagoons and the KHL-OU 3 of the site. The purpose of this remedy is to eliminate or reduce the potential migration of polychlorinated biphenyls (PCBs) to the Kalamazoo River and to reduce the risk associated with exposure to the PCB-contaminated materials. This RA includes excavation and on-site containment of PCB-contaminated soils, sediments and paper residuals (residuals) from the landfill berms (berms), the five former lagoons, as well as from the river and floodplains adjacent to the KHL. This RA will address the principal threat posed by the five former lagoons and the KHL-OU 3 by controlling the current and potential release of PCB contamination to the Kalamazoo River. The RA addresses the following migration pathways from the KHL-OU 3 and the five former lagoons: release of leachate to groundwater, surface water, and surface sediments; and the release of PCB-contaminated residuals/soils to surface water by erosion, surface run-off, and berm failure.

The major components of the selected remedy include:
Excavation of PCB-contaminated soils, sediments, and residuals from the berms, the KSSS floodplain, the five former lagoons, and the Kalamazoo River directly adjacent to the KHL. Excavated soils, sediments, and residuals containing PCBs will be consolidated in Cell 4 of the KHL prior to construction of the cover.

The construction of a cover (cap) over the landfill will minimize infiltration of precipitation through the landfill and prevent potential migration of PCB from the landfill into the Kalamazoo River. The cap will also prevent exposure to the PCBs. The cap is designed to meet the Michigan Solid Waste Landfill closure regulations pursuant to Part 115, Solid Waste Management, of the Michigan Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA). The cap consists of the following components from bottom to top:

- At least a six-inch thick, select granular fill, gas venting layer will be placed on top of the residuals. This gas venting layer is designed to collect landfill gas and route it to the passive venting system. Select granular fill from an off-site source, having a minimum hydraulic conductivity of $1 \times 10^{-3}$ centimeters per second, will be used to construct the layer. The gas venting system will consist of 19 passive gas vents placed in the select granular fill. Excessive gas generation is not anticipated due to the type and age of the residuals.

- At least a 30-mil thick polyvinyl chloride (PVC) geomembrane liner (barrier layer) will be placed over the select granular fill. The PVC geomembrane liner will act as a barrier to minimize infiltration of precipitation into the residuals.

- At least a 24-inch thick general fill layer (protective layer) will be placed above the 30-mil PVC geomembrane liner. The protective layer will be capable of sustaining the growth of non-woody plants, will have adequate water holding capacity, and will be sufficiently thick to allow for erosion losses. The water that accumulates within this layer will drain to a ditch or a sedimentation outlet structure and subsequently discharge into the Kalamazoo River.

- At least a six-inch thick vegetative layer (erosion layer) will be placed over the protective layer. The erosion layer has been designed to promote vegetative growth, provide surface water runoff, and minimize erosion.

- Erosion protection will be placed on the berms of the landfill. This protection will be sufficient to protect the berms from a 100-year flood event. Part of this erosion protection will be provided by a steel sheet piling stabilization wall present between the Kalamazoo River and the berms of Cells 1 and 2. This wall extends 1020 feet and is located on the north side of the landfill. It extends from the most northern point of Cell 1, southeast along the perimeter of Cells 1 and 2, to the junction where the corners of Cells 2, 3, and 4 meet.

- Groundwater monitoring wells will be installed and wells that are no longer needed will be abandoned.

- Groundwater and surface water monitoring shall be performed for at least 30 years following landfill capping. Monitoring of the groundwater aquifer under the landfill will be conducted in accordance with Parts 115, Solid Waste Management, and 201, Environmental Remediation, of the NREPA, and TSCA (761.75(b)(6)) at a minimum. Monitoring of the surface water and sediments will be conducted in accordance with TSCA (761.75(b)(6)) at a minimum to assess the effectiveness of the remedy.

- Deed restrictions limiting future land use will be imposed at the KHL-OU 3.

- Access restrictions, including enclosing the entire KHL-OU 3 and the five former lagoons with a fence, will be implemented.

- A permanent marker will be placed at the KHL-OU 3 and warning signs will be posted on the fence every 500 feet and on all entry gates.

Statutory Determination

The Michigan Department of Environmental Quality (MDEQ) has concluded that the selected RA is protective of human health and the environment. The United States Environmental Protection Agency (EPA), through its concurrence with this ROD, agrees with the MDEQ's conclusion. The selected RA complies with federal and state requirements that are legally applicable or relevant and appropriate to the RA. Through this concurrence with this ROD, the Regional Administrator of the EPA has determined that a waiver of certain chemical waste landfill requirements under the Toxic Substances Control Act is appropriate for the RA selected in this ROD. This remedy utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable for the KHL-OU 3 and five former lagoons. This remedy does not satisfy the statutory preference for remedies that reduce the toxicity, mobility, or volume as a principal element because treatment of the principal threats of the KHL-OU 3 was not found to be practicable.

A review will be conducted within five years after commencement of the RA to ensure that the remedy continues to provide adequate protection of human health and the environment because this remedy will result in hazardous substances remaining on-site above health-based levels.

David Ullrich, Acting Regional Administrator
United States Environmental Protection Agency

2/10/98
Date

Russell J. Harding, Director
Michigan Department of Environmental Quality

10/17/97
Date

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## I. DECISION SUMMARY

### A. SITE LOCATION AND DESCRIPTION

The King Highway Landfill-Operable Unit 3 (KHL-OU 3) and the Georgia-Pacific former lagoons 1, 2, 3, 4, and 5 (five former lagoons) of the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund site (site) are the subject of this Record of Decision (ROD). The King Highway Landfill (KHL), the King Street Storm Sewer (KSSS) floodplain, and the adjacent Kalamazoo River are included in the KHL-OU 3. The site is located in Kalamazoo and Allegan Counties, Michigan. The site includes three miles of Portage Creek, from Cork Street to its confluence with the Kalamazoo River, and 80 miles of the Kalamazoo River, from Morrow Lake Dam downstream to Lake Michigan. Also included in the site are five paper residual disposal areas and five paper mill properties. Paper residuals (residuals) are the waste material produced by the paper mill during the paper making process. The five disposal areas have been organized into the following four Operable Units (OUs) of this site:

OU 1: Allied Paper Property/Bryant Mill Pond
OU 2: Willow Boulevard/A-Site
OU 3: King Highway Landfill
OU 4: 12th Street Landfill

The KHL-OU 3 is located in the city of Kalamazoo, Kalamazoo Township, Kalamazoo County, Michigan. More specifically, it is located in the north half of the northeast quarter of Section 23, Township 2S, Range 12W. The KHL-OU 3 is bordered immediately on the south by King Highway (M-96), on the west by the Grand Trunk Railroad right-of-way, and the KSSS floodplain, and by the Kalamazoo River on the north and east sides. The five former lagoons are located on the Georgia-Pacific mill property, directly north of the KHL-OU 3, across the Kalamazoo River (see Figure 1). The Kalamazoo River flows in a westerly direction and is a major tributary to southern Lake Michigan.

The soils, sediments, water column, and biota at the site are contaminated with Polychlorinated Biphenyls (PCBs), a hazardous substance and probable human carcinogen. Based on studies conducted between 1972 and 1989 it has been estimated that there are well over 300,000 pounds of PCBs in the sediments and soils of, or adjacent to, Portage Creek and the Kalamazoo River portions of this site. The KHL-OU 3 and the five former lagoons are both locations which contain PCBs and are considered to be a current ongoing source of PCBs to the Kalamazoo River. The PCBs continue to migrate from the KHL-OU 3 and the five former lagoons into the environment and off-site due to the erosion caused by river flow and surface water run-off. This contributes to the ongoing contamination of the soils, sediments, water column, and biota of the site (i.e. the Kalamazoo River) and Lake Michigan. The Michigan Department of Community Health has issued a species specific no consumption fish advisory annually since 1977 for the

Kalamazoo River portion of this site due to the PCB contamination. The Kalamazoo River and Portage Creek have been designated a site of environmental contamination under Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), due to PCB contamination. The Kalamazoo River and Portage Creek have been identified as an Area of Concern by the International Joint Commission on the Great Lakes due to the detrimental impact the release of PCBs have on Lake Michigan. Due to the PCB contamination, in August 1990 the site was placed on the National Priorities List (NPL) in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 1980 PL 96-510 as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986 also known as Superfund.

The floodplains, wetlands, and river corridor of the Kalamazoo River and Portage Creek provide habitat for numerous important fish and aquatic species, semi-aquatic species, and terrestrial species. Species of special concern at the site are mink and bald eagles due to their sensitivity to PCB contamination. The Kalamazoo River, downstream of the KHL-OU 3 and the five former lagoons, flows through the Kalamazoo River Nature Center and the Allegan State Game area. The river is a critical natural resource for southwest Michigan providing recreational opportunities such as fishing, hunting, trapping, bird watching, boating, and swimming.

The river also provides recreational opportunities for hiking and biking along the extensive trail systems on the banks of the river. Plans have been made to extend the river trail system along the area where the KHL-OU 3 is located. Residents and visitors to the area enjoy wetland and woodland habitats which support numerous species of plants, birds, reptiles, amphibians, and mammals.

The KHL was originally a series of lagoons used by the Kalamazoo Paper Company to dewater the underflow of the paper mill's primary clarifier located on the north side of the river. Prior to the construction of the King Highway lagoon system, this area consisted of floodplains, wetlands, and a former oxbow of the Kalamazoo River. According to an evaluation of the National Wetlands Inventory Maps during the Remedial Investigation (RI), all the former wetlands within the landfill area have been eliminated by past landfilling activities. The entire KHL-OU 3 is located in the 100-year floodplain of the Kalamazoo River. However, the height of the KHL berms extend above the 100-year flood elevation.

The land immediately adjacent to the south and southwest sides of the KHL-OU 3 is classified for industrial or secondary commercial use. The Kalamazoo River and an associated mix of non-forested shrub or central hardwood deciduous forested lands are located directly east, north, and northwest of the KHL-OU 3. Across the Kalamazoo River to the north lies the Georgia-Pacific Corporation, Kalamazoo Paper Mill and the five former lagoons. The KHL-OU 3 is located east of Riverview Park, formerly Sutherland Park, and Red Arrow Golf Course. South of the landfill, on the other side of M-96, is a city of Kalamazoo salt storage facility and parking lot area for road work and

snow removal equipment. Superior Metal Shredder, Inc./Superior Salvage Co./Superior Industrial Waste Disposal Service lies to the southwest. In close proximity are two residential neighborhoods located approximately 1,100 feet to the west in the city of Kalamazoo and 1,200 feet to the southeast in Kalamazoo Township.

The KHL covers 23.2 acres and consists of four Cells. The total volume of residuals in the KHL is estimated at 282,000 cubic yards. Cells 1, 2, and 3 were permitted under Michigan Solid Waste regulations as a landfill and are nearly filled to capacity. These Cells have a total area of 12.3 acres. Cell 4 covers 3.1 acres and contains 12,700 cubic yards of residuals and is not filled to capacity. Cell 4 was never permitted as part of the landfill. The majority of the residuals in Cell 4 are submerged in a pond formed by the transport of water from the other three cells to Cell 4 through culverts in the dikes. The four cells are separated by dikes approximately 10 to 20 feet high. These dikes were constructed of sand and gravel in the 1950s. They have been "topped" with gravel and are used as access roads. Access roads and non-fill areas compose 7.9 acres in the KHL.

In addition to the four Cells of the KHL, PCB-contaminated sediments, soils, and residuals located on the berms, in the KSSS floodplain, in the Kalamazoo River directly adjacent to the KHL, and in the five former lagoons at Georgia-Pacific Corporation are addressed by this ROD (see Figure 1). The Kalamazoo River is located immediately north and east, while the KSSS floodplain is located immediately to the west of the KHL. The five former lagoons owned by Georgia-Pacific Corporation are located on the north side of the Kalamazoo River next to the paper mill clarifier. These former lagoons were used historically to dewater the underflow from the paper mill clarifier. The estimated volumes of PCB-contaminated materials located in the KSSS floodplain and the five former lagoons are 1,000 and 3,000 cubic yards, respectively. These areas contain PCB-contaminated floodplain soils, sediments, and residuals that will be excavated and consolidated into Cell 4 prior to the placement of the cap.

The geology immediately underlying the KHL is composed mostly of glacial sand and gravel deposits with traces of clay and silt. These glacial deposits have been extensively reworked by the Kalamazoo River. Bedrock, consisting of Coldwater Shale deposited in the Mississippian period of the Paleozoic Era, lies approximately 50 to 70 feet below the land surface. The RI indicates that there is a layer of clay, or sand and clay, approximately 15 feet below ground surface.

Beneath the landfill, the direction of groundwater flow is normally north-to-northwest toward the Kalamazoo River. The groundwater horizontal gradient ranges from 0.0014 to 0.0006 feet/feet. The gradient and flow direction are influenced by the Kalamazoo River.

## B. SITE HISTORY AND ENFORCEMENT ACTIVITIES

Carbonless copy paper manufactured between 1957 and 1971 contained Aroclor 1242 (A1242) as an ink carrier or solvent. The A1242 was used as a solvent for certain dyes that were encapsulated in small spheres and applied to one side of the paper during the

coating process. The walls of the spheres consisted of a gelatin-gum arabic formulation which ruptured and released the dye when subject to pressure. The average A1242 content in a sheet of carbonless copy paper was 3.4 percent.

From 1957 to 1971 about 44,162,000 pounds of A1242 were used in the production of carbonless copy paper across the country. This amount accounted for an estimated 28 percent of all the PCBs that the Monsanto Chemical Company (the sole domestic producer of PCBs) sold for plasticizer applications during this period, and 6.3 percent of Monsanto's total domestic PCB sales for those 15 years.

Approximately 19 percent of carbonless copy paper was recycled across the country in 1976 and a greater proportion may have been recycled in previous years. Assuming an average recycling effort of 20 percent for this paper over the 15-year period when PCBs were in carbonless copy paper, then recycled paper streams across the country contained 20 percent of the 44 million pounds of PCBs used in carbonless copy paper, a total of some 8.8 million pounds of PCBs in recycled paper pulp and effluents over 15 years.

The PCBs in the carbonless copy paper that the Georgia-Pacific Corporation, Kalamazoo Paper Mill deinked and repulped either became integrated into new paper products or became part of the paper mill's waste stream. The process of deinking and subsequent pulping of the recycled stock broke the spheres containing the PCB-laden dyes in the paper. These PCBs were then distributed throughout the paper recycling process, including the waste stream. However, some of the PCBs in the carbonless copy paper remained in the recycled pulp and subsequently were incorporated into new paper products. For example, PCB concentrations as high as 433 milligrams/kilogram (mg/kg) were measured in paperboard used for cereal packaging in 1971. Although PCB use in the manufacturing of carbonless copy paper was discontinued in 1971, the paper recycled by the Georgia-Pacific Corporation, Kalamazoo Paper Mill likely continued to contain PCBs for several years after 1971.

The Georgia-Pacific Corporation, Kalamazoo Paper Mill deinked office waste paper which contained carbonless copy paper at two mills during the 15-year period when PCBs were in the paper. Originally, the facility consisted of five mills, three for making paper products, and two for finishing and converting. Mills 1 and 3 both performed deinking operations starting in the early 1950s. Mill 3 discontinued deinking in the late 1960s, was refurbished, and resumed operations in 1975. Mill 1 deinked continuously until the late 1970s. Raw paper waste from all the mills was routed to a clarifier. The clarifier effluent was pumped directly into the Kalamazoo River (i.e., the site) until 1964 when it was rerouted to the city of Kalamazoo Wastewater Treatment Plant.

The underflow from the clarifier was dewatered and disposed of at various locations over the years. From the mid-1950s until the late 1950s the residuals were placed in the original five former lagoons next to the primary clarifier on the mill property. In

the late 1950s residuals were sent to the King Highway lagoons, which later became the KHL, on the south side of the Kalamazoo River for dewatering. The original five dewatering lagoons were then used as an emergency backup system.

Georgia-Pacific Corporation dewatered residuals in the King Highway lagoons until 1977. Some of the dried residuals from the King Highway lagoons were excavated and disposed of at the Willow Boulevard disposal area, another OU of the site, until 1975. By 1975 the Willow Boulevard disposal area was filled to capacity, and Georgia-Pacific Corporation purchased the A-Site disposal area, another OU of the site, from Allied Paper, Inc. Some of the residuals from the King Highway lagoons were excavated and disposed of at the A-Site disposal area. Georgia-Pacific Corporation used the A-Site disposal area for disposal of residuals from 1975 until 1987.

The King Highway lagoons were granted a landfill construction permit by the Michigan Department of Environmental Quality (MDEQ) in June 1982. The King Highway lagoons became the KHL and Cells 1, 2 and 3 were first granted an operating permit by the MDEQ in 1983 under what is now Part 115, Solid Waste Management, of the NREPA as a solid waste landfill. It is still a licensed solid waste landfill. It should be noted that although Cell 4 contains residuals, it was never licensed as a solid waste landfill. Most of the residuals present in Cell 4 were disposed of by Georgia-Pacific prior to Cells 1, 2, and 3 being licensed. However, some of the residuals were transported to Cell 4 in storm water runoff from Cells 1, 2, and 3. Starting again in 1987 Georgia-Pacific Corporation used the KHL for the disposal of dewatered residuals. When active, the cells were being filled from west to east at a rate of about 150 cubic yards per day.

The MDEQ conducted a routine surface water and biota sampling of the Kalamazoo River mouth during 1970. The results of this investigation indicated that the river was discharging PCBs into Lake Michigan. During a biological survey conducted by the MDEQ in 1971, pursuant to a Federal Water Pollution Control Agency program to monitor tributaries of Lake Michigan, it was determined that PCBs in the Kalamazoo River were continuing to discharge to Lake Michigan and were bioavailable.

Using the existing data for the site, the MDEQ scored the site following the CERCLA Hazard Ranking System. The scoring package was proposed to the United States Environmental Protection Agency (EPA) on May 5, 1989, and the site was nominated to the NPL. On August 3, 1990 the site was officially placed on the NPL and was designated a Superfund site.

The Potentially Responsible Party (PRP) search conducted in 1990 identified three PRPs for the PCB contamination of this site. These three PRPs, HM Holdings, Inc./Allied Paper, Inc., Georgia-Pacific Corporation, and Simpson Plainwell Paper Company, were notified of their status on June 23, 1990. More recent efforts on the part of the three initial PRPs to determine other PRPs, have identified the James River Paper Corporation.

Since 1994 the James River Corporation has participated as a PRP on this site. These four parties have been identified as PRPs due to past paper mill operations involving the recycling and deinking of office waste paper that included carbonless copy paper during the period from 1957 to at least 1971. In accordance with Part 31, Water Resources Protection, of the NREPA and CERCLA, on December 28, 1990, the liable parties signed an Administrative Order by Consent (AOC) with the state of Michigan and agreed to fund and conduct the Remedial Investigation/Feasibility Study (RI/FS) for the site. The RI/FS for the KHL-OU 3 was initiated in July 1993, completed by December 1996, and has been placed in the Administrative Record.

## C. COMMUNITY PARTICIPATION

The Responsiveness Summary in Section L discusses the involvement of the community during the RI/FS and remedy selection process and demonstrates that the public participation requirements of Sections 113 (k) (2) (i-v), and 117 of CERCLA have been met at the KHL-OU 3 and the five former lagoons. The decision is based on the Administrative Record.

## D. SCOPE AND ROLE OF KHL-OU3 WITHIN THE SITE STRATEGY

The MDEQ and the EPA have identified the human health and ecological threat at the KHL-OU 3 and the five former lagoons to be the PCB-contaminated paper residuals, soils, and sediments in and adjacent to the KHL-OU 3 and the five former lagoons. The purpose of this ROD is to select the final remedial action (RA) for the KHL-OU 3 and the five former lagoons of the Allied Paper, Inc./Portage Creek/ Kalamazoo River site. This ROD addresses only the KHL-OU 3, and the five former lagoons within the site. Remedy selection for the other three OUs, Portage Creek, and the Kalamazoo River will be addressed by other RODs. This final remedy is a source control remedy, which contains or controls PCB contamination from the landfill, five former lagoons, contaminated soils, sediments or paper residuals, and the potential release of leachate. The remedy addresses all media including contaminated paper residuals, soils, sediments, and migration pathways considered to represent an unacceptable risk of release to both surface water and river sediments. The ROD for the KHL-OU 3 and the five former lagoons will be consistent with the final remedy for the site.

This remedy does not include treatment that would reduce toxicity, mobility, or volume as a principal element. Although incineration was evaluated as a treatment option, the volume of the waste, implementation time, and the technical and administrative difficulties associated with implementation and cost made it prohibitive. Available information on the landfill operations indicate that it would not be feasible to attempt to locate concentrated areas of PCBs (hot spots) because PCBs are spread evenly throughout the landfill. Therefore, alternatives were not evaluated for location and treatment or removal of hot spots in the KHL-OU 3 or the five former lagoons. As required by the National Contingency Plan (NCP), a periodic (five year) review of the remedy effectiveness will be performed.

Under the existing AOC, interim measures have been required to mitigate threats of potential berm failures due to wind and water erosion damage. A 1,020 feet long steel retaining wall has been constructed to stabilize a portion of the berm and control erosion on the north side of the KHL.

## E. SUMMARY OF SITE CHARACTERISTICS

Based upon the information available to the MDEQ, the KHL is a mono-fill of paper residuals with an estimated total volume of 282,000 cubic yards. PCBs are the primary constituent of concern at the KHL-OU 3 and the five former lagoons. PCBs are oily liquids, clear to light yellow in color, and have no smell or taste. PCBs are hazardous substances and are carcinogenic. Characteristics of PCBs that cause them to be especially persistent in the environment are that they bind strongly to soils, do not dissolve well in water, are not easily broken down, and are lipophilic and therefore have an affinity for the fatty tissue of biota which causes them to bioaccumulate.

The PCBs at the KHL-OU 3, the five former lagoons, and the site are closely associated with the fine gray, kaolinite clays and wood fibers that compose the paper residuals. These residuals containing PCBs were disposed of in the KHL-OU 3 starting in 1957 and were part of a waste stream produced by the recycling of office waste paper. This office waste paper contained several types of paper, including the carbonless copy paper which contained PCBs. The recycling of paper, including deinking at the paper mill, resulted in the discharge of PCBs to the river either by the discharge of effluents or by sludge disposal in disposal areas adjacent to the river. The KHL is one of these disposal areas. The presence of these residual disposal areas on Georgia-Pacific Corporation's property, adjacent to the Kalamazoo River, is a direct result of waste treatment systems operated at their paper mill.

The RI at the KHL-OU 3 was conducted in 1993. Based upon public comment on the Proposed Plan some additional data was collected on the groundwater and the residuals in Cell 4. As a result of the RI, it was concluded that KHL-OU 3 and the five former lagoons on the north side of the Kalamazoo are sources and potential sources of PCB contamination to the Kalamazoo River and its floodplain in the vicinity of the KHL-OU 3 and the five former lagoons.

PCB contamination exists in the residuals in and around the landfill and the five former lagoons. In Cells 1, 2, and 3 the PCB concentrations generally increase with depth. The maximum PCB concentration found in the top 16 feet of residuals in Cells 1, 2 and 3 was 8.8 mg/kg. Concentrations over 50 mg/kg were detected at depths of 16 to 30 feet. The maximum concentration in the residuals is 310 mg/kg. However, PCB concentrations in the top eight feet of residuals in Cell 4 are as high as 69 mg/kg. The reason for the difference between Cells 1, 2, and 3 and Cell 4 is that Georgia-Pacific Corporation continued to dispose of residuals at the KHL after the use of PCBs in the manufacture of carbonless copy paper was halted. Tests of residuals that were recently added to the

landfill did not detect PCBs with the exception of one sample in 1987 that contained 6.5 mg/kg PCBs. The soils below the KHL have a maximum PCB concentration of 9.9 mg/kg. Soil borings taken from the KSSS area immediately west of the KHL showed PCB levels in the range of 0.37 to 99 mg/kg. The maximum PCB concentration found in the berms was 77 mg/kg.

Groundwater flows across the KHL to the Kalamazoo River with a horizontal gradient that averages 0.0004 feet/feet. PCBs were not detected in groundwater. However, PCBs were detected in a leachate sample collected from Monitoring Well 10R at a concentration of 1.4 µg/L (micrograms per liter).

One surface water sample was collected from the pond in Cell 4 and analyzed for PCB. The analytical results show a PCB concentration of 0.026 µg/L.

Five surficial residual samples collected in Georgia-Pacific Corporation's five former lagoons detected PCB concentrations in the range of 0.2 to 110 mg/kg. PCBs were detected in three subsurface residual samples in the former lagoons at concentrations from 3.4 to 70 mg/kg. Five soil samples from below the lagoons contained PCB levels in the range of 0.043 to 2.9 mg/kg.

## F. SUMMARY OF SITE RISKS

**Estimated Human and Ecological Risks if Current Conditions at the KHL-OU 3 and Five Former Lagoons Continue in the Future:**

A Baseline Risk Assessment (BRA) to evaluate risks to human health and the environment under current, unremediated conditions was conducted. A number of pathways were screened from the quantitative evaluation based on qualitative screening and the assumption that exposure scenarios could not be assigned a probability of occurrence in the foreseeable future due to restrictions presented in Part 115, Solid Waste Management, of the NREPA and the assurances by the Georgia-Pacific Corporation that the landfill would be closed in accordance with Part 115, Solid Waste Management, of the NREPA. The land use restrictions will be permanent under Part 115, Solid Waste Management, and Part 201, Environmental Remediation, of the NREPA. Because the waste is identical (i.e., waste was generated from the same source at similar concentrations), the routes of exposure are the same, and the receptors are the same at the KHL-OU 3 and the five former lagoons, the MDEQ has determined that the BRA for the KHL-OU 3 is applicable to the five former lagoons.

The pathways which were not evaluated quantitatively in the BRA include the use of groundwater, ingestion of and dermal contact with Kalamazoo River water and sediments, ingestion of biota, and inhalation of constituents released to air from surface/soil residuals by nearby residents, trespassers, and anglers.

The land use restrictions required by Part 115, Solid Waste Management, and Part 201, Environmental Remediation, of the NREPA will prohibit residential use of the KHL in the future. Based upon this information it was not necessary to quantitatively evaluate the future residential scenario for the KHL-OU 3 or the five former lagoons. This includes the possibility of using the groundwater under the KHL and the five former lagoons as a potable water source.

Groundwater, which is discharged to the river, is not used as a potable water source either on-site or downgradient of the KHL-OU 3. Since residential use will be restricted on the KHL-OU 3 as a condition of the Part 115, Solid Waste Management, of the NREPA permit, and as a condition of closure under Parts 115, future installation of potable wells is effectively precluded. Although PCBs were detected in leachate from one well, they were not detected during the RI groundwater sampling or in the previous landfill permit groundwater monitoring.

Ingestion of, and dermal contact with Kalamazoo River water, sediments, and ingestion of biota were not evaluated quantitatively. The sampling results for the KHL indicate that as long as the berms remain intact, the potential impact from the PCBs inside the KHL on surface water quality can be prevented. In particular, the low concentrations of PCBs in the leachate, the lack of detection of PCBs in groundwater, the low hydraulic gradient (0.0004), and low permeability of the residuals all lead to the conclusion that impacts on surface water should be limited if the primary migration pathways continue to be controlled. The present primary migration pathways for the release of PCBs into the river are erosion of residuals from the berms and floodplains and the five former lagoons. The largest potential risk and migration pathway is the release of PCB-contaminated residuals due to failure of the landfill berms. The risks from PCB contamination already existing in Kalamazoo River water, soils, residuals, sediments and biota will be assessed in other OU's.

Inhalation by nearby residents of constituents released to the air from surface soil and residuals was not evaluated quantitatively due to studies which demonstrated it to be insignificant. During the RI, an air monitoring program was conducted at two other OUs of the site (Willow Boulevard/A-Site and Allied Paper, Inc.). Emissions were found to be in compliance with Part 55, Air Pollution Control, of the NREPA. Given that the KHL-OU 3 has lower concentrations of PCBs in surface soils than the two test OUs, and that the distance to the nearest receptor is greater, risks associated with hypothetical, off-site exposure via inhalation was considered negligible.

1. Human Health Risks

Based on the environmental setting of the KHL-OU 3, issues regarding the movement of constituents on-site (i.e., on the KHL-OU 3), and potential for transport off-site (i.e., off the KHL-OU 3), the exposure pathways that are currently possible in association with the OU include:

Incidental ingestion and dermal contact with surface soil/residuals by on-site workers, especially bulldozer operators.

Inhalation of airborne particulates by on-site workers.

Dermal contact with surface water in Cell 4 by on-site workers.

Incidental ingestion and dermal contact with surface soil/residuals, and sediments in Cell 4 by trespassers.

Incidental ingestion and dermal contact with residuals along the berms by anglers.

A Hazard Index (HI) approach was used to characterize the overall potential for non-carcinogenic risk associated with exposure to multiple constituents that cause non-carcinogenic health effects. The calculation of an HI in excess of one indicates the potential for adverse health effects. Both pathway-specific and total HIs less than one are estimated for workers, trespassers, and anglers.

Carcinogenic risk is expressed as a probability of developing cancer as a result of lifetime exposure. The EPA's acceptable target range for carcinogenic risk associated with Superfund sites in general is one in ten thousand ($1.0 \times 10^{-4}$) to one in one million ($1.0 \times 10^{-6}$) and the MDEQ's target is one in one hundred thousand ($1.0 \times 10^{-5}$). For all Superfund sites the acceptable risk level is established by the EPA Regional Administrator on a site-by site basis.

Risks associated with constituents detected in soils, residuals, and sediments were evaluated. Based on the environmental setting of the KHL-OU 3, and the likely foreseeable use of the KHL-OU 3, surface soil/residuals, sediments, and water in Cell 4 were determined to be the media of interest at Cell 4 in the BRA. The constituents of concern in these media were PCBs and polychlorinated dibenzodioxin/polychlorinated dibenzofuran (PCDD/PCDF). Therefore, hypothetical risks based on potential exposures to PCB and PCDD/PCDF in surface soil, surface residuals, surficial sediments, and water in Cell 4 were estimated in the assessment. Additional RI work conducted in Cell 4 indicated that the residual PCB concentrations are greater, (an average of 4.9 mg/kg and a maximum of 69 mg/kg) than those used in the risk assessment. Consequently, the risk assessment may underestimate the potential risks at the KHL-OU 3.

On-site workers, trespassers, and anglers are considered the primary receptors of interest. Total cancer risks are $4 \times 10^{-6}$ for workers, $1 \times 10^{-5}$ for on-site trespassers, and $1 \times 10^{-4}$ for anglers. Although exposures associated with failure of the berms have not been quantitatively estimated, it is reasonable to assume that this event would cause additional unacceptable human health and ecological risk. Consequently, the risk assessment recognized that long-term berm stability will be needed to prevent unacceptable human and wildlife exposure to PCBs from the KHL-OU 3.

2. Environmental Risks

The primary habitat in the vicinity of the KHL-OU 3 and the five former lagoons is the Kalamazoo River and associated floodplain, which are immediately adjacent and border the northern, western, and eastern perimeter of the KHL-OU 3. The Kalamazoo River and associated floodplains are immediately adjacent to the south and north of the five former lagoons. The one surface water body within the KHL-OU 3, other than the river, is the pond in Cell 4. The five former lagoons are also surface water bodies. The water cover in the KHL-OU 3 and the five former lagoons is derived from direct precipitation and surface runoff from surrounding areas.

The perimeter berm upslope from the Kalamazoo River is part of the ecosystem encompassed by the Kalamazoo River and floodplain. There are no barriers to prevent fauna movement from the floodplain or river to the KHL-OU 3. This is also true for the five former lagoons on the north side of the Kalamazoo River. The wooded areas of the berms also provide habitat for terrestrial or river wildlife species. According to the National Wetland Inventory map for the Kalamazoo Quadrangle, two wetlands are located within the KHL-OU 3. Results of field reconnaissance for wetland assessment indicate these wetland areas were eliminated by past physical alterations related to licensed landfill activities at the KHL. The Cell 4 area supports emergent wetland vegetation at its southernmost extent and provides habitat for waterfowl species, aquatic organisms, and mammals.

The aquatic and semi-aquatic flora and fauna in the vicinity of the KHL-OU 3 and the five former lagoons are typical of the area. Most aquatic and semi-aquatic wildlife species are generally associated with the adjacent Kalamazoo River and floodplain. The aquatic habitat of the river and floodplain adjacent to the KHL-OU 3 and five former lagoons provide support for development of various life stages of fish, turtles, and amphibians which are associated with the Cell 4 pond and the five former lagoons.

Terrestrial wildlife species which inhabit the KHL-OU 3 are likely limited to small mammals (e.g., mice, squirrels, woodchucks, mink, raccoons, and muskrats ) and birds, especially passerines and waterfowl. Because the Kalamazoo area is part of a major migratory flyway route for waterfowl species, Cell 4 may be used as a migratory stopover. The water cover in Cell 4 and the five former lagoons attracts and supports waterfowl throughout the nesting season because water is present year-round and the vegetation surrounding these areas provides adequate cover and materials for nesting. Larger mammals, such as white-tailed deer, also use the KHL-OU 3 as indicated by the deer tracks observed in the residuals. Muskrat dens have been observed in the Cell 4 pond and there is evidence of woodchucks burrowing into the berms of the landfill.

There are no federally-listed endangered or threatened species known to reside within the KHL-OU 3 or the five former lagoons. Because the KHL-OU 3 and the five former

lagoons are sources of PCBs to the rest of the site, it is important to consider all the federally-listed endangered or threatened species that inhabit the entire site. The federally-listed endangered or threatened species known to reside within the site are two turtle species that are considered scarce, one snake that is considered endangered, and bald eagles, which are considered a threatened species that live and nest on the site. There are also four threatened and one scarce plant species.

The potential effects of exposure to PCBs in the Cell 4 pond were evaluated for acute toxicity to crustaceans and insects. The risk assessment assumed that Cell 4 does not support a fish population. However, during the RI fish were observed in Cell 4. Consequently, the risk assessment probably underestimates the potential ecological risk at the KHL-OU 3.

Although the risk assessment does not quantitatively assess the chronic exposure to PCBs of fish, aquatic invertebrates, amphibians (e.g., frogs), and reptiles (e.g., snakes and turtles), it does recognize that these organisms in Cell 4 would bioaccumulate PCBs and pass them up the food chain to other organisms which would feed upon them. These bioaccumulation food chain effects present the greatest potential for ecological and human health exposure and significant risks. This would occur when organisms forage on the organisms from Cell 4 and when the PCBs from the KHL-OU 3 or the five former lagoons are released into the river.

The presence of PCB-contaminated residuals, soils, and sediments in areas outside Cells 1, 2, 3, and 4 of the KHL and the five former lagoons is evidence of past or ongoing releases to the Kalamazoo River. The landfill berms are being eroded by surface water runoff and the continuous flow of the Kalamazoo River. These berms contain residuals that are being exposed and eroded into the Kalamazoo River. The possibility of failure of the berms located between the Kalamazoo River and Cells 1, 2, and 4 of the KHL is a potential threatened release. Some of the potential threatened release from berm failure has been addressed by the construction of a steel retaining wall along the berms of Cells 1 and 2.

Environmental risks identified in the draft Environmental Risk Assessment on the Kalamazoo River associated with PCB exposure at the site, of which the KHL-OU 3 and the five former lagoons are a part, are as follows:

> Sensitive aquatic biota such as invertebrates and fish, are likely to be adversely affected both directly (direct contact) and indirectly (food chain) by PCBs in surface water and streambed sediment.
>
> These effects include mortality, reproductive effects (i.e. failure), decreased populations and growth effects for sensitive species.

- PCB contamination of surface water and streambed sediment indirectly affect sensitive piscivorous predators, such as mink, through consumption of PCB-contaminated prey.

  Impaired reproduction of mink and, ultimately, decreases in mink populations are the observed effects of PCB contamination in aquatic prey.

  Other less sensitive piscivorous predators, such as bald eagles, are at risk if fish are the predominant prey item consumed and if foraging takes place mostly within contaminated aquatic areas. Bald eagles on this site have failed to reproduce for at least the last seven year.

- Terrestrial and semi-aquatic biota are at risk from PCB-contaminated floodplain sediment and surface soil, depending on life history (e.g., foraging behavior, diet, mobility) and sensitivity to PCBs.

  Carnivorous terrestrial species, represented by the red fox, are likely to be at significant risk if foraging is concentrated in riparian areas with PCB-contaminated floodplain sediment and diet consists of prey that reside in PCB-contaminated areas.

  Omnivorous terrestrial species, represented by mice, appear to have moderate potential for risk from PCB-contaminated surface soil/floodplain sediment. These risks would be location-dependent, and would be influenced by diet, season, and mobility of consumers and by the level of contamination of food items.

  Omnivorous birds that consume a substantial amount of vegetation, represented by the robin, may be at risk if consumed terrestrial plants are taken from highly contaminated areas. Consumption of terrestrial invertebrates such as earthworms is expected to contribute substantially less to total PCB intake than ingestion of plants, based on estimated PCB levels in plants and measured PCB concentrations in earthworms.

  Semi-aquatic herbivorous mammals, represented by muskrat, are at risk from PCB contamination because estimated dietary doses exceed recommended threshold values for rats. Muskrats contaminated with PCBs also cause adverse effects to muskrat predators because some muskrats contain PCBs in excess of recommended dietary limits for PCB-sensitive predators such as mink.

Based on the results of the risk assessment for the KHL-OU 3 and the draft Ecological Risk Assessment for the site, the objectives of the RAs must address the following risks:

Human health risks for persons who trespass or work on the KHL-OU 3.

Human health and ecological risks due to past migration of PCBs to the Kalamazoo River and surrounding floodplain areas, and berms from the KHL-OU 3.

Human health and ecological risks due to the continued release of PCBs to the Kalamazoo River, surrounding floodplain areas, and berms from the KHL-OU 3.

Human health and ecological risks due to the potential additional release of PCBs to the Kalamazoo River and surrounding floodplain areas caused by failure of the berms of the KHL-OU 3.

## G. DESCRIPTION OF ALTERNATIVES

A total of seven potentially applicable technology types which incorporated 60 different process options were screened with respect to technical implementability at the KHL-OU 3. Based upon this screening, three potentially applicable technology types were chosen as alternatives. The 'No Action' option was evaluated as required by the NCP to provide a baseline for comparison of the effectiveness of the remedial alternatives. Under the No-Action alternative, no active response measures would occur. No reduction of toxicity, mobility, or volume through treatment of the PCBs would be provided by this alternative. Therefore, no risk reduction would result from this action. The No-Action alternative would not meet the applicable or relevant and appropriate requirements (ARARs) and would not be protective. One of these ARARs, Part 115, Solid Waste Management, of the NREPA requires that the closure of KHL-OU 3 meet or exceed the closure requirements for a landfill pursuant to the Michigan Solid Waste regulations (Part 115 , Solid Waste Management, of the NREPA). Due to the above factors the No-Action alternative was eliminated by screening in favor of the three potential alternatives listed below.

Alternative 1: Landfill Closure (consolidation, containment and capping in accordance with Part 115, Solid Waste Management and Part 201 , Environmental Remediation, of the NREPA).

Alternative 2: Removal and disposal of residuals.

Alternative 3: Removal, treatment, and disposal of residuals.

All cost estimates presented with the following descriptions of the three alternatives are expressed in 1994 dollars and are based on conceptual engineering and design. Capital costs consist of direct costs (e.g., construction, equipment, transportation, disposal, analytical, treatment, and contingency) and indirect costs (e.g., engineering, legal, and permitting fees) incurred by implementing a specific alternative. Operation and Maintenance (O&M) costs refer to long-term, post-construction measures necessary to ensure continued effectiveness of an RA. The O&M costs were developed for the first year of system operation and a 30-year present worth (PW) cost analysis. Total net PW

cost represents the sum of money, if invested in the base year and disbursed as needed, that would be sufficient to cover costs of a remedy over its planned life (assumed to be 30 years for comparison purposes).

**Alternative 1: Landfill Closure (consolidation, containment and capping in accordance with Part 115, Solid Waste Management and Part 201 Environmental Remediation, of the NREPA)**

| | |
|---|---|
| **Capital Cost:** | **$1.6 - $2.7 million** |
| **O&M Cost:** | **$125,000 a year** |
| **Net PW Cost:** | **$3.2 - $4.3 million (capital and O&M)** |
| **Implementation Time frame:** | **1.0 years** |

Alternative 1 involves the consolidation and containment of the PCB-contaminated residuals via landfill closure, reinforcement of the existing berms, and long-term monitoring. Closure of the landfill would be in accordance with Part 115, Solid Waste Management, of the NREPA regulations and the landfill's current permit. Reinforcement of the existing berms would increase stability and minimize the potential for berm failure under flood conditions. Long-term monitoring involves the collection and analysis of groundwater and surface water samples to track the effectiveness of the cap. Alternative 1 also includes institutional controls such as fencing, deed restrictions and sign posting to reduce potential human exposure to soil, residuals, and other media.

**Alternative 2: Removal and Disposal of Residuals**

| | |
|---|---|
| **Capital Cost:** | **$55.5 - $66.5 million** |
| **O&M Cost:** | **None** |
| **Net PW Cost:** | **$55.5 - $66.5 million (capital and O&M)** |
| **Implementation Time frame:** | **2.9 years** |

Alternative 2 includes the excavation, dewatering, and off-site disposal of all residuals from the KHL-OU 3. Dewatering the residuals would yield a material acceptable for disposal and transport to an off-site commercial landfill. Water obtained from residuals dewatering would be treated on-site to remove any PCBs prior to discharge.

Based on the results of the RI, at least 76,000 cubic yards of residuals contain PCB concentrations greater than 50 parts per million (ppm) and would be regulated for off-site disposal by the federal Toxic Substances Control Act (TSCA), Subpart D of the Code of Federal Regulations (CFR) 40 CFR 761. Such residuals would be disposed at an existing commercial TSCA disposal facility. The 206,000 cubic yards of residuals with PCB concentrations less than 50 ppm would not be regulated by TSCA and could be disposed of at a commercial sanitary landfill.

Following the excavation and disposal of the residuals, the landfill would be graded to match the surrounding area. A minimum 6-inch layer of topsoil with vegetative cover would be installed to minimize erosion to comply with Soil Erosion and Sedimentation Control requirements of Part 91, Soil Erosion and Sedimentation Control, of the NREPA.

The capital costs associated with this alternative are higher than Alternative 1 due to the high cost of off-site disposal of residuals at a TSCA facility (off-site TSCA disposal represents approximately 50 to 70 percent of the total capital cost for Alternative 2).

**Alternative 3: Removal, Treatment, and Disposal of Residuals**

| | |
|---|---|
| **Capital Cost:** | **$55.0 - $426.8 million** |
| **O&M Cost:** | **None** |
| **Net PW Cost:** | **$55.0 - $426.8 million (capital and O&M)** |
| **Implementation Time frame:** | **4.4 years** |

Alternative 3 is the same as Alternative 2 with the addition of a treatment step. Residuals with a PCB concentration 50 ppm or greater (76,000 cubic yards) would be treated either on-site or off-site via incineration prior to disposal in a commercial sanitary landfill. The 206,000 cubic yards of residuals containing less than 50 ppm of PCBs would be disposed at a commercial sanitary landfill.

The capital costs associated with this alternative are higher than Alternatives 1 and 2 due to the high cost of incineration (on-site or off-site) of the residuals (incineration represents approximately 50 to 90 percent of the total capital cost for Alternative 3).

## H. SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

In accordance with the NCP, the relative performance of each alternative is evaluated using nine criteria (section 300.430(e)(9)(iii) of the NCP) as a basis for comparison. The alternative which provides the "best balance" with respect to the nine criteria is determined from this evaluation.

### 1. Threshold Criteria

a. **Overall Protection of Human Health and the Environment** addresses whether a remedy provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled through treatment, engineering, or institutional controls. The selected remedy must meet these criteria.

The major exposure pathways of concern at the KHL-OU 3 and the five former lagoons are ingestion of, inhalation of, and dermal contact with PCB-contaminated soils or residuals in the landfill; ingestion of and dermal contact with PCB-contaminated

soils/residuals and sediments in Cell 4; dermal contact with PCB-contaminated surface water in Cell 4; and ingestion of and dermal contact with PCB-contaminated river sediments and soils along the berms. The release of PCB-contaminated residuals from berm, the landfill cells, floodplain, river sediments, or berm failure would result in the bioaccumulation of PCBs and food chain effects which will also be considered in the evaluation of exposure pathways.

Alternative 1 would provide adequate protection of human health and the environment by controlling the mobility of contaminants through engineering and institutional controls. The cap, constructed in accordance with Part 115, Solid Waste Management, of the NREPA along with institutional controls, would serve as a barrier to human and wildlife contact with the residuals. An adequate cap would also decrease the rate of precipitation infiltration, thereby further reducing the potential for PCBs to migrate into groundwater. Stabilization of the berms would prevent release of residuals due to berm failure. Consolidation of residuals from the berms, the KSSS floodplain, the five former lagoons, and the Kalamazoo River into Cell 4 prior to the construction of the cap will reduce the potential for exposure and migration of PCBs into the environment.

Alternative 2 would provide adequate protection of human health and the environment by eliminating the presence of contaminants at the KHL-OU 3 through removal and off-site disposal of PCB-contaminated waste.

Alternative 3 also provides adequate protection of human health and the environment by eliminating the presence of contaminants on-site. The removal and off-site disposal/incineration of PCB-contaminated waste eliminates risks associated with PCBs at the KHL-OU 3.

b. **Compliance with ARARs** addresses whether a remedy will meet ARARs set forth in federal and state environmental laws and/or justifies a waiver from such requirements.

ARARs of most concern to this remedial action include the following:

- Surface water quality standards in Part 31, Water Resources Protection, of the NREPA.
- Rules established under Part 31, Water Resources Protection, of the NREPA regarding permit requirements.
- Site-specific pollutant limitations and performance standards which are designed to protect surface water quality in the Federal Clean Water Act.
- Regulations prohibiting unauthorized obstruction or alteration of any navigable water in the United States (dredging, fill, cofferdams, piers, etc.) in the Federal River and Harbor Act;
- Regulations on dredging or filling of lakes or stream bottoms found in Part 301, Inland Lakes and Streams, of the NREPA.

- Rules prescribing soil erosion and sedimentation control plans, procedures, and measures found in Part 91, Soil Erosion and Sedimentation Control, of the NREPA.
- Rules regarding construction, operation, and maintenance of sewage systems in Part 41, Sewerage Systems, of the NREPA.
- Rules prohibiting the emissions of air contaminants in quantities which cause injurious effects to human health, animal life, plant life of significant economic value, and/or property found in Part 55, Air Pollution Control, of the NREPA.
- National ambient air quality standards in the Federal Clean Air Act.
- Transportation and handling requirements in the USDOT Placarding and Handling regulations for materials containing PCBs at concentrations of 20 ppm or greater.
- Rules specifying environmental response, risk assessment, RAs and site cleanup criteria in Part 201, Environmental Remediation, of the NREPA.
- Regulations regarding the construction, operation, and closure of sanitary landfills, solid waste transfer facilities, and solid waste processing plants in Part 115, Solid Waste Management, of the NREPA.
- Effluent standards for toxic compounds including PCBs in the Federal Water Pollution Control Act Toxic Pollutant Effluent Standards.
- TSCA disposal regulations at 40 CFR Section 761.60 et seq. are applicable to PCBs at concentrations of 50 ppm or greater when such PCBs are "taken out of service". Under the RAs being considered, TSCA disposal regulations could be triggered by the excavation of PCB-contaminated residuals, sediments and soils from the five former lagoons. These residuals, sediments and soils would be consolidated into Cell 4. Pursuant to 40 CFR Section 761.60 (a) (4), PCBs must be disposed of : "(i) in an incinerator which complies with 761.70; or (ii) in a chemical waste landfill which complies with 761.75." The TSCA compliant chemical waste landfill disposal method is generally much less expensive than incineration.

The on-site consolidation and containment of PCBs, whether from sediments, soils, or residuals excavated from the five former lagoons will be placed in Cell 4. Cell 4, being an existing landfill cell does not possess the following chemical waste landfill requirements found in Section 761.75 (b):

- Bottom liner requirements (the landfill does not have a bottom li .:r) (761.75 (b) (1) and (2)).
- Hydraulic conditions - fifty foot distance between bottom liner and historical high water table or leachate collection system (761.75 (b)(3)).
- Leachate collection requirements (761.75 (b)(7)).

Pursuant to 761.75 (c) (4), the EPA Regional Administrator may determine that one or more of the requirements in 761.75 (b) is not necessary to protect against unreasonable risk of injury to health or the environment from PCBs and may waive such requirements. In this ROD, the EPA Regional Administrator waives the requirements in 761.75 (b) (1), (2), (3) and (7) because the final RA will provide protection to human health and the environment against unreasonable risks of injury. Also taken into consideration are the following facts: 1.) no significant reduction in long-term risks would be gained from off-site disposal of the relatively small quantity of PCBs in excavated residuals, sediments, and soils as compared to the amount of PCBs being contained in place under the final cover; 2.) PCBs are the only chemical of concern; 3.) the PCB concentrations in the five former lagoons are lower than those already present in the KHL; 4.) the PCB-contaminated residuals were disposed of prior to February 17, 1978; 5.) the residuals originated from the same industrial process waste stream; and, 6.) the leachability of PCBs from the KHL-OU 3 is not likely because of the high PCB affinity for the residuals and the low hydraulic conductivity of the residuals (~ 1 x $10^{-7}$ cm/sec.).

Alternatives 2 or 3 would be in compliance with state and federal ARARs. These two alternatives would comply with the TSCA disposal requirements of 761.60. Alternative 1 includes the on-site consolidation, containment and capping as described in this ROD and would be in compliance with all state and federal ARARs except TSCA regulations of 40 CFR Section 761.75 (b). With a waiver for the chemical landfill requirements of 761.75 (b), Alternative 1 meets the disposal requirements of 761.60. Alternative 1 would also comply with the existing permit closure requirements of the NREPA because a part of the KHL of the KHL-OU 3 is a permitted solid waste landfill.

2. Primary Balancing Criteria

c. **Long-term Effectiveness and Permanence** refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup goals have been met.

Alternative 1 would provide long-term effectiveness via consolidation of residuals from outside the berms and five former lagoons into Cell 4, stabilization of the berms, and isolation of the residuals by capping. Permanence of the remedy would require that long-term operation and maintenance and monitoring will be provided to insure that the remedy maintains its reliability to protect human health and the environment over time.

Alternative 2 would provide long-term effectiveness via removal of residuals and off-site disposal. This alternative provides permanence without any additional actions at the site.

Alternative 3 would provide long-term effectiveness via removal and treatment of residuals. This alternative also provides permanence without any additional actions at the site.

d. **Reduction of Toxicity, Mobility, or Volume Through Treatment** addresses the statutory preference for selection of RAs that employ treatment technologies that permanently and significantly reduce toxicity, mobility, or volume of the hazardous substance as a principal element.

As detailed above, the stated programmatic goal of the EPA, as expressed in the NCP, is to select remedies that are protective over time and "minimize untreated waste" (section 300.430 (a) (1) (i)). The NCP states that the EPA will use "treatment to address the principal threats at a site, wherever practicable" (section 300.430 (a) (l) (iii) (A)). This preference is satisfied when treatment is used to reduce the principal threats at a site through destruction of toxic contaminants, reduction of total mass of toxic contaminants, irreversible reduction in contaminant mobility, or reduction of total volume of contaminated media.

Alternative 3 is the only alternative that would result in the reduction in the toxicity, mobility, or volume of contaminants through treatment. Incineration would destroy the PCBs in the soils, sediments and residuals. Approximately 76,000 cubic yards of residuals with PCB concentrations equal to or greater than 50 ppm would be treated on-site or off-site via incineration prior to disposal in a commercial sanitary landfill. The remaining 206,000 cubic yards of residuals containing PCB concentrations less than 50 ppm would also be disposed of in a commercial sanitary landfill.

e. **Short-term Effectiveness** considers the time to reach cleanup objectives and the risks an alternative may pose to site workers, the community, and the environment during remedy implementation. This criterion also considers the reliability and effectiveness of any mitigative measures taken during remedy implementation to control those short-term risks.

Alternative 1 has some potential short-term negative impacts. Capping is a standard engineering process and standard safety precautions would be undertaken to reduce the likelihood of accidents during construction. Truck traffic during cap construction may increase noise and dust. Protective controls would need to be in place to suppress dust that contains PCB concentrations so that federal and state air-quality standards are complied with. The use of erosion controls would mitigate short-term effects posed by potential siltation and contaminant release to the Kalamazoo River. Standard health and safety requirements would protect site workers and the community from unacceptable exposures to hazardous substances. The discharge of treated water to the Kalamazoo River or to the Kalamazoo Wastewater Treatment Plant will be in accordance with the substantive requirements of National Pollutant Discharge Elimination System (NPDES) discharge criteria (as administered by the state under Part 31, Water Resources Protection, of the NREPA), which are set at protective levels.

Alternative 1 has the greatest short-term effectiveness since the project could be completed within one year, which is a shorter time period than that for the completion of Alternatives 2 and 3. In comparison, implementation of Alternative 2, which includes the

excavation and off-site disposal of all residuals and the restoration of the former cell areas, would take approximately 2.9 years to complete. Alternative 3, which involves excavation and incineration as a treatment process, has the longest implementation time. This is due to project schedule uncertainties associated with the permitting process, incinerator acquisition, construction and modification, test burn requirements, and trial runs required prior to approval of the treatment technology for the residuals. Excavation, incineration, and off-site disposal of the residuals to be treated and restoration of the former cell areas would take approximately 1.9 years to complete. When considering the uncertainties mentioned above, the time frame of Alternative 3 could increase by 2.5 years to 4.4 years.

Alternatives 2 and 3 would need proper controls so there would be no significant short-term effects on the community or exceedances of standards during implementation due to the projected level of excavation and on-site incineration activity. During the 2.9 years to implement Alternative 2 and the 4.4 years to implement Alternative 3, the air emission, from excavation and on-site incineration of Alternative 3 or the excavation and removal of the residuals of Alternative 2, could cause dust levels in the ambient air to exceed protective standards. For these Alternatives, truck traffic during the removal operations may increase noise and dust. Protective controls would need to be in place to suppress the dust and associated PCB emissions that could be above the federal and state air quality standards to reduce short-term impacts to site workers and local residents. The use of erosion controls would mitigate the short-term effects posed by potential siltation and contaminant release to the Kalamazoo River. Standard health and safety requirements would protect site workers and the community from short-term exposures to hazardous substances. The discharge of treated water to the Kalamazoo River or to the Kalamazoo Wastewater Treatment Plant will be in accordance with the substantive requirements of NPDES discharge criteria (as administered by the state under Part 31, Water Resources Protection, of the NREPA), which are set at protective levels.

f. **Implementability** is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

No significant implementation problems are projected for Alternative 1. Cap materials are expected to be obtainable from nearby sources and standard construction methods will be used. Hauling cap materials to the KHL-OU 3 may increase the wear and tear on the local roads. Environmental controls will be needed to prevent air emissions to the atmosphere or migration of PCBs to the river during consolidation and cap construction.

Alternatives 2 and 3 meet the implementation criteria stated above. The excavation techniques used for both these Alternatives are generally well proven. However, environmental controls will be needed to prevent the emissions or migration of PCBs to the river and the atmosphere during excavation and on-site incineration. Material handling problems and mechanical breakdowns could slow the treatment progress. Also, based on the restricted availability of mobile incineration units (six to twelve month lead time may be required for scheduling purposes) and the testing required for agency

approval, the implementability of Alternative 3 may be more difficult. Public acceptance of on-site incineration may also be a hindrance to the implementation of Alternative 3.

g. **Cost** includes estimated capital and O&M cossts, also expressed as net present worth.

Table 2
Estimated cost of Remedial Alternatives for KHL-OU 3

| Alternative | Capital (million) | O & M (per year) | Present Worth (million) |
|---|---|---|---|
| 1 (Cap & Contain) | $ 1.6 - 2.7 | $125,000 | $ 3.2 - 4.3 |
| 2 (Removal & Disposal) | $55.5 - 66.5 | None | $55.5 - 66.5 |
| 3 (Removal, Treatment & Disposal | $55.0 - 426.8 | None | $55.0 - 426.8 |

3. Modifying Criteria

h. **Support Agency Acceptance** addresses whether or not the Support Agency agrees with, or objects to, any of the remedial alternatives.
The EPA, as the support agency for the site, is in agreement with the analyses and recommendations presented in the RI/FS, Proposed Plan and this ROD. The EPA concurs with the selected alternative as presented below.

i. **Community Acceptance** addresses the public's general response to the remedial alternatives and to the Proposed Plan. Specific responses to public comments are addressed in the attached Responsiveness Summary.

## I. THE SELECTED REMEDY

In accordance with CERCLA and the NCP, and based upon the evaluation of the RI/FS and the nine criteria, **Alternative 1** has been selected as the method providing overall effectiveness proportional to its cost to adequately protect human health and the environment against exposures to hazardous substances at the KHL-OU 3 and the five former lagoons. The RA for the KHL and the five former lagoons shall meet the limited industrial cleanup criteria set forth in sections 20120(a) and 20120(b) of the NREPA. The RA for the KSSS floodplain which is adjacent to the KHL shall meet the residential cleanup criteria set forth in sections 20120(a) and 20120(b) of the NREPA and the TSCA.

1. Cap
Under Alternative 1, a cap shall be placed on Cells 1, 2, 3, and 4 of the KHL-OU 3 in compliance with the current requirements of Part 115, Solid Waste Management, of the NREPA concerning cap specifications for closure of a solid waste disposal facility. The construction of the cap over the landfill will minimize infiltration of precipitation through

the landfill and prevent continued migration of residuals from the landfill into the Kalamazoo River. The cap consists of the following components from bottom to top.

At least a 6-inch thick select granular fill gas venting layer will be placed on top of the residuals. This gas venting layer is designed to collect landfill gas (methane) and route it to the passive venting system. Select granular fill from an off-site source, having a minimum hydraulic conductivity of $1 \times 10^{-3}$ cm/s, will be used to construct the layer. The gas venting system will consist of 19 passive gas vents placed in the select granular fill. The venting system shall be monitored to determine whether emissions may cause potential health effects. If potential health effects are indicated, an emission treatment system shall be placed in the venting system to reduce the emissions to acceptable levels. However, excessive gas generation is not anticipated due to the type and age of the residuals.

At least a 30-mil thick polyvinyl chloride (PVC) geomembrane liner (barrier layer) will be placed over the select granular fill. The barrier layer will act as a barrier to minimize infiltration of precipitation into the residuals.

At least a 24-inch thick general fill layer (protective layer) will be placed above the 30 mil PVC geomembrane liner. The protective layer will be capable of sustaining the growth of non-woody plants, will have adequate water holding capacity, and will be sufficiently thick to allow for erosion losses. The water that accumulates within this layer will drain to a ditch or a sedimentation outlet structure and discharge to the Kalamazoo River.

At least a 6-inch thick vegetative layer (erosion layer) will be placed over the protective layer. The vegetative layer has been designed to promote vegetative growth, provide surface water runoff, and minimize erosion. The feasibility of using vegetation that would provide habitat, such as native grasses, will be addressed in the Remedial Design.

2. Erosion Protection

Placement of erosion protection on the berms of the landfill will be in compliance with TSCA section 761.75 (b) (4), and Part 115, Solid Waste Management, of the NREPA. This protection will be sufficient to protect the berms up to two feet above the 100-year flood event. Part of this erosion protection will be provided by a steel sheet piling stabilization wall which was constructed during 1994 and 1996 as an interim action. The 1,020 foot wall was constructed between the Kalamazoo River and the perimeter of Cells 1 and 2 on the north side of the landfill. It extends from the most northern point of Cell 1, southeast along the perimeter of Cells 1 and 2, to the junction where the corners of Cells 2, 3, and 4 meet. Selection of erosion protection for the remaining sides of Cells 1 and 4 will be determined as part of the Remedial Design (RD).

3. Installation of Groundwater Monitoring System
Groundwater monitoring wells will be installed and wells that are no longer needed will be properly abandoned. This groundwater monitoring system will developed in RD.

4. Long-Term Monitoring
Groundwater and surface water monitoring shall be performed for at least 30 years following landfill capping. Monitoring of the groundwater aquifer under the landfill will be conducted in accordance with Parts 115, Solid Waste Management, and 201, Environmental Remediation, of the NREPA, and TSCA (761.75(b)(6)) at a minimum. Monitoring of the surface water and sediments will be conducted in accordance with TSCA (761.75(b)(6)) at a minimum to assess the effectiveness of the remedy.

5. Consolidation
The PCB-contaminated residuals, soil, and sediments from the berms and the adjacent floodplains of the KSSS will be consolidated into Cell 4 of the KHL. Verification sampling will be conducted, and if the MDEQ's unrestricted residential cleanup criteria of 1.0 parts per million is achieved, the action will be accepted as a final remedy. If this criteria is not achieved, the PRPs will propose, within 45 days, specific additional actions, including an implementation schedule, that will be taken to achieve any of the appropriate state cleanup criteria.

PCB-contaminated residuals and sediments from the adjacent Kalamazoo River will be consolidated into Cell 4 of the KHL as an interim response action using visual criteria. The focus of this action will be to consolidate residuals at the toe of the berms back into Cell 4.

PCB-contaminated residuals and soils from the Georgia-Pacific five former lagoons will also be consolidated into Cell 4 as a final remedial action with a cleanup criteria for PCBs of 21 ppm. Land use restrictions will be imposed and recorded with the register of deeds. Verification sampling will be conducted to determine if the limited industrial cleanup criteria of 21 ppm has been achieved. Upon completion of the excavation the five former lagoons will be backfilled with clean soil. Soil erosion control measures will also be implemented.

6. Institutional Controls - Fencing
Institutional controls will be relied upon to provide additional effectiveness to the remedy. A fence shall be installed around the entire KHL and the five former lagoons to restrict access. This shall be installed as part of the RA.

7. Posting and Permanent Marker
As required by Part 201, Environmental Remediation, of the NREPA, a permanent marker will be placed at the KHL describing the restricted area of the KHL-OU 3 and the nature of any restrictions. Warning signs will also be posted on the fence every 500 feet and on all entry gates. Construction details shall be part of the RD.

8. Deed Restrictions
Deed restrictions shall be placed on the landfill area property to regulate the future use of the KHL-OU 3.

9. Long-Term Maintenance
Long-term maintenance and post-closure care will be provided. Detailed plans shall be part of the Remedial Design.

10. Financial Assurance Mechanisms (FAM)
Financial Assurance will be established by the PRPs in accordance with Part 201, Environmental Remediation and Part 115, Solid Waste Management, of the NREPA. The Financial Assurance mechanism will insure that there are funds available to pay for monitoring, operations and maintenance, oversight, and other costs determined by the state to be necessary to assure the effectiveness and integrity of the remedial action. If the U.S. EPA conducts the action this FAM will not be necessary.

11. Other Provisions
Mitigative measures will be taken during remedy construction activities to minimize the noise and dust impacts of construction upon the surrounding community. Fugitive dust emissions shall not violate the National Ambient Air Quality Standards for emissions of particulate matter smaller than 10 microns or the standards contained in Part 55, Air Pollution Control, of the NREPA.

12. Five Year Review
A review will be conducted within five years after commencement of the RA to ensure that the remedy continues to provide adequate protection of human health and the environment because this remedy will result in hazardous substances remaining on-site above health-based levels.

13. Significant Modifications to the 1994 Proposed Plan and the 1997 Revised Proposed Plan
The revised Proposed Plan released in July 1997 presented the all following modifications to the preferred alternative with the exception of the change in the unlimited residential criteria.

a. Changing gabions to steel sheet pilings
The erosion control and berm stabilization system has been changed to steel sheet piling from the rock filled wire baskets called gabions that were originally proposed. Both of these options were reviewed in the FS. The steel sheet piling was selected because of site-specific advantages it has over gabions discussed below.

During a storm in 1994 the berm was damaged when several trees were uprooted. This left a 120 foot section of the berm vulnerable to erosion and failure. For this small section of berm an interim response action was necessary to prevent berm failure. The sheet piling could be quickly and cost-effectively implemented to stabilize this section of

berm. Also, there was a greater degree of confidence that the installation of the sheet piling could be properly constructed and would result in fewer construction impacts on the river than gabions. Review of the berm conditions to either side of the sheet piling indicated that installation of another 900 feet of sheet piling as an interim action would further stabilize the berm and be consistent with the final remedy.

The sheet piling was driven 20 feet into the ground to stabilize the base of the berm. The retaining wall was extended two feet above the 100-year flood elevation, 765.5 feet above sea level, to prevent surface water runoff from eroding residuals and soils into the Kalamazoo River and protect the berm and the KHL-OU 3 from severe flood events. During construction, precautions were taken to minimize impacts of the work on the Kalamazoo River. Residuals found on the surface or in the berms were removed and placed in a storage area in Cell 4. Clean material was then placed in this void between the sheet pile retaining wall and the remaining berm. The entire area has been seeded to promote growth of vegetation across the surface.

b. Remediation of Cell 4

Additional investigation of Cell 4 indicated that it contains a greater volume of PCB-contaminated residuals (12,700 cubic yards) than originally estimated, that the PCB concentration was greater than originally estimated (maximum of 69 mg/kg), and that the pond supported numerous species of aquatic life including fish. Based upon the new information the remedial decision was made to cap and contain the residuals in-place. The pond in Cell 4 will be dewatered prior to the construction of the cap.

c. Consolidation of PCB-contaminated residuals, soils and sediments

PCB-contaminated residuals have migrated from the landfill and have contaminated the soils and sediments of the berms, KSSS area, floodplain, and the Kalamazoo River directly adjacent to the KHL-OU 3. The PCB-contaminated residuals, soils, and sediments from these areas will be excavated and consolidated in Cell 4 prior to construction of the cap. There are also five former lagoons on the north side of the river next to the paper mill's clarifier that will be excavated and placed in Cell 4 at the same time. This action will take advantage of the most cost-effective disposal alternative available.

The unlimited residential cleanup criteria was specified in the Revised Proposed Plan was 2.3 ppm. However, this cleanup criteria has been changed to 1.0 ppm due to a change in the absorption factor use to calculate this criteria. This will affect the consolidation of contaminated materials from the KSSS floodplain.

## J. STATUTORY DETERMINATIONS

The selected remedy must satisfy the requirements of Section 121 of CERCLA to:

1. Protect human health and the environment
2. Comply with ARARs

3. Be cost-effective
4. Utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable
5. Satisfy the preference for treatment as a principal element of the remedy.

The implementation of Alternative 1 at the KHL-OU 3 of the site satisfies the requirements of CERCLA as detailed below:

1. Protection of Human Health and the Environment

The presence of PCBs in areas outside the KHL berms is evidence of a past or ongoing release of PCBs from the KHL-OU 3. The possibility of berm failure between Cells of the KHL-OU 3 and the Kalamazoo River is recognized as a threatened release of PCBs, a hazardous substance and carcinogen, into the environment. The implementation of the selected alternative will reduce and control potential risks to human health and the environment posed by exposure to PCB-contaminated residuals.

The potential risk caused by exposure to PCBs by workers ($4 \times 10^{-6}$), on-site trespassers ($1 \times 10^{-5}$), and anglers ($1 \times 10^{-4}$) will be reduced by the cap which will provide a barrier that will eliminate the PCB exposure pathways of inhalation, ingestion, and dermal contact. All PCB-contaminated materials with a; concentration greater than or equal to 1 mg/kg from the berms and KSSS, concentration greater than or equal to 21 mg/kg from the former five former lagoons, and all residuals from the Kalamazoo River immediately adjacent to the KHL-OU 3 will be excavated further reducing any exposure pathway for workers, on-site trespassers, or anglers. The dewatering of the pond in Cell 4 prior to capping will again eliminate all exposure pathways associated with the PCB-contaminated surface water at the KHL-OU 3. By eliminating the exposure pathways the alternative effectively reduces the risk to less than $1 \times 10^{-6}$. Institutional controls in the form of fencing and posting along with deed restrictions will further reduce the likelihood of any exposure to humans.

To a large extent, the reduction of risk to wildlife from exposure to PCBs at the KHL-OU 3 will be accomplished in the same way. The consolidation of PCB-contaminated residuals, soils, and sediments into Cell 4 and construction of the cap will reduce the exposure pathways. Also, the dewatering of the Cell 4 pond will further reduce the exposure pathways.

The largest potential risk to human health and the environment is from the failure of the berms. This alternative will provide stabilization and erosion protection for the berms to prevent failure. The selected remedy also protects the environment by reducing the potential risk posed by PCBs migrating to the surface water (the Kalamazoo River). Capping the landfill, in addition to reducing any potential further risk posed by exposure to landfill contaminants, will reduce precipitation infiltration through the residuals over time.

No unacceptable short-term risks or cross-media impacts will be caused by implementation of the remedy. The community and site workers may be exposed to noise and dust nuisances during the consolidation and construction of the cap. As mentioned above, mitigative measures will be taken during excavation and construction activities to minimize the noise and dust impacts of construction on the surrounding community.

2. Compliance with ARARs

The selected remedy will comply with the federal and/or state ARARs (categorized as chemical-specific, location-specific, and action-specific) listed below:

a. Chemical-specific ARARs

Chemical-specific ARARs regulate the release of specific substances which have certain chemical characteristics. Chemical-specific ARARs typically determine the extent of cleanup at a site.

*Federal Chemical-Specific ARARs:*

TSCA:
TSCA establishes the requirements for handling, storage, and disposal of PCB. This is an ARAR for any residuals, sediments, and soils containing PCB concentrations 50 ppm or greater which are moved. However, as it applies to the KHL-OU 3 and the five former lagoons, some of the requirements of TSCA are waived as explained below.

Excavation of residuals and soils from the five former lagoons will be required. Some of these excavated residuals will contain PCBs at concentrations 50 ppm or greater. Excavation and consolidation of these residuals on-site could be considered disposal of PCBs pursuant to 40 CFR 761.1 (c). In this case, 40 CFR 761.60 (a) (4) would require any non-liquid PCBs at concentrations of 50 ppm or greater in the form of contaminated soils to be disposed of: (i) in an incinerator which complies with 761.70; or (ii) in a chemical waste landfill which complies with 761.75. The selected remedy provides for disposal of PCBs in a landfill that does not meet the following chemical waste landfill requirements of Section 761.75 (b): bottom liner requirements because the landfill does not have a bottom liner (761.75 (b) (1) or (2) ); leachate collection requirements and requirements for a fifty-foot distance between the bottom liner and the historical high water table (761.75 (b) (3) and (b) (7). However, pursuant to 761.75 (c) (4), the EPA Regional Administrator has determined that for the KHL-OU 3, the TSCA chemical landfill requirements in 761.75 (b) (1), (2), (3), and (7), are not necessary to protect human health and the environment. For the KHL-OU 3, the low permeability site cover, long-term monitoring, access restrictions, and institutional controls included in the selected remedy provide protection to public health and the environment. The written

statement of this finding and waiver by the EPA Regional Administrator, as required in 761.75 (c) (4), is provided by signing this ROD.

The excavated material will be consolidated and stored in Cell 4 which is to be its final disposal location. The remedy will comply with 40 CFR 761.75 (b) (4) (i) and (ii), which requires diversion of surface water runoff from a 24-hour, 25-year storm. The remedy will also comply with 761.75 (b) (5) which requires surface water and groundwater monitoring, and 761.75 (b) (9) which includes requirements for support facilities. 40 CFR 761.75 (b) (8) is not an ARAR because it applies to the operations of chemical waste landfills.

Clean Water Act (CWA) - Ambient Water Quality Criteria:
This act and criteria establish monitoring requirements for the discharge of waste treatment effluents to waters of the United States. They are applicable to the excavation and dewatering of sediments from the Kalamazoo River and residuals from the five former lagoons. They would also be applicable for the dewatering of the pond and residuals in Cell 4.

Federal Water Pollution Control Act (WPCA), Toxic Pollution Standards:
This act would be applicable to the discharge to the Kalamazoo River of water from all dewatering activities.

*State Chemical-Specific ARARs:*

Part 201, Environmental Remediation, of the NREPA provides for the identification, risk assessment, and evaluation of contaminated sites within the state; therefore, Part 201, Environmental Remediation, of the NREPA is applicable or relevant and appropriate to soils, sediments and residuals at the KHL-OU 3. The EPA considers the substantive portions of Part 201, Environmental Remediation, of the NREPA, especially Section 20118, to be ARARs for the RA at this site. The rules provide, *inter alia*, that RAs shall be protective of human health, safety, welfare, and the environment of the state. To achieve the standard of protectiveness, Part 201, Environmental Remediation, of the NREPA, in particular those in Section 20120(a) and 20120(b), specify that a RA shall achieve a degree of cleanup under residential, industrial, or commercial criteria.

The MDEQ has determined that the limited industrial criteria pursuant to Sections 20120(a) and 20120(b) of the NREPA would be appropriate for the KHL and the five former lagoons. The property is zoned for industrial use, therefore, limited industrial criteria would provide an appropriate RA for the KHL and the five former lagoons. The limited industrial cleanup criteria of 21 ppm will be met. The unrestricted residential cleanup criteria of 1.0 ppm will be met on the landfill berms and in the KSSS floodplain.

Part 31, Water Resources Protection, of the NREPA establishes effluent standards in accordance with the Federal WPCA and the CWA, and also establishes rules specifying standards for several water quality parameters including PCBs. This would be applicable to the discharge to the Kalamazoo River of water from all dewatering activities.

b. Location-Specific ARARs:

Location-specific ARARs are those requirements that relate to the geographical position of a site. These include:

*Federal Location-Specific ARARs:*

TSCA:

TSCA establishes the requirements for disposal of sediments, soils, and residuals with PCB concentrations 50 ppm or greater. This would be an ARAR for containment or disposal of any residuals, sediments, and soils containing PCB concentrations 50 ppm or greater disposed of after February 17, 1978. It is believed that the PCB-contaminated residuals at the KHL-OU 3 and five former lagoons were disposed of prior to this date. However, TSCA would regulate the disposal of these excavated residuals. For this remediation some of the requirements of TSCA have been waived as explained above.

*State Location-Specific ARARs:*

Part 115, Solid Waste Management, of the NREPA:

Part 115, Solid Waste Management, of the NREPA contains regulations regarding the construction, operation, and closure of sanitary landfills, solid waste transfer facilities, and solid waste processing plants. These regulations govern the long-term monitoring and closure of the landfill. Part of the landfill area is licensed under this act.

c. Action-Specific ARARs:

Action-Specific ARARs are requirements that define acceptable treatment and disposal procedures for hazardous substances.

*Federal Action-Specific ARARs:*

CWA and Discharge to Waters of the United States:

The CWA and Discharge to Waters of the United States establishes site-specific pollutant limitations and performance standards which are designed to protect surface water quality. Types of discharges regulated under the CWA include discharge to surface water, indirect discharge to a Publicly Owned Treatment Works (POTW), and discharge of dredge or fill materials to United States waters. This Act is relevant to the treatment and discharge of water to the Kalamazoo River or POTW from the dewatering operations.

Rivers & Harbor Act:
The Rivers & Harbor Act prohibits unauthorized obstruction or alteration of any navigable water in the United States (dredging, fill, cofferdams, etc.). It also requires federal agencies, where possible, to avoid or minimize adverse impacts of federal actions upon wetlands and floodplains. Remedial activities conducted in such a way will avoid obstruction or alteration of the Kalamazoo River channel.

U.S. Department of Transportation (USDOT) Placarding and Handling:
USDOT Placarding and Handling regulates the transportation and handling of materials containing PCBs at concentrations of 20 ppm or greater. This ARAR may apply to transport of residuals from the five former lagoons, the KSSS, and the river adjacent to the landfill to Cell 4.

Clean Air Act:
The Clean Air Act establishes requirements for constituent emission rates in accordance with national ambient air quality standards. Excavation and cap construction activities will be regulated by the Clean Air Act.

*State Action-Specific ARARs:*

Part 91, Soil Erosion and Sedimentation Control, of the NREPA:
This Act regulates earth changes, including cut and fill activities which may contribute to soil erosion and sedimentation of surface water. Part 91, Soil Erosion and Sedimentation Control, of the NREPA would apply to any such activity where more than one acre of land is affected or the regulated action occurs within 500 feet of a lake or stream. Part 91, Soil Erosion and Sedimentation Control, of the NREPA would be applicable to the cap construction activities since these actions could impact the Kalamazoo River, which is less than 500 feet from the KHL-OU 3 and the five former lagoons.

Part 301, Inland Lakes and Streams, of the NREPA:
The Michigan Inland Lakes & Streams Act regulates the dredging or filling of lake or stream bottoms. Activities associated with the selected remedy, sediment removal, and berm stabilization are regulated under this Act due to the proximity of the KHL-OU 3 and the five former lagoons to the Kalamazoo River.

Part 115, Solid Waste Management, of the NREPA:
Part 115, Solid Waste Management, of the NREPA contains regulations regarding the construction, operation, and closure of sanitary landfills, solid waster transfer facilities, and solid waste processing plants. These regulations govern the long-term monitoring and closure of the landfill. The landfill area is licensed under this Act.

Part 41, Sewerage Systems, of the NREPA:
Part 41, Sewerage Systems, of the NREPA establishes rules regarding construction, operation, and maintenance of sewage systems. This may be applicable since the treated dewatering water is discharged to the municipal sewer system.

Part 31, Water Resources Protection, of the NREPA:
Part 31, Water Resources Protection, of the NREPA establishes the rules regarding water and wastewater discharges, provisions for the non-degradation of groundwater quality, and uses of groundwater. This is applicable for discharge of waters to the Kalamazoo River. Part 31, Water Resources Protection, of the NREPA also includes the rules regarding permit requirements for discharges. Although permits are not required for on-site Superfund actions, the substantive requirements must be met for all dewatering operations that discharge to the Kalamazoo River.

Part 55, Air Pollution Control, of the NREPA:
Rules prohibiting the emission of air contaminants in quantities which have injurious effects on human health, animal life , plant life of significant economic value, and/or property are established in Part 55, Air Pollution Control, of the NREPA. This would be applicable to excavation and cap construction activities.

Michigan Occupational Safety and Health (MIOSHA) Act 154:
MIOSHA establishes the rules for safety standards in the work place and is applicable to the remediation activities.

TSCA, 40 CFR 761, sets specific requirements for the disposal of PCBs and would therefore be applicable to the site.

Part 201, Environmental Remediation, of the NREPA:
As described earlier, the NREPA provides for the identification, risk assessment, and evaluation of contaminated sites within the state. The MDEQ has determined that the substantive provisions of Part 201, Environmental Remediation, of the NREPA are applicable or relevant and appropriate to the KHL-OU 3 and the five former lagoons. Part 201, Environmental Remediation, of the NREPA rules require that RAs shall be protective of human health, safety, welfare, and the environment of the state.

3. Cost-Effectiveness

Table 1 lists the costs associated with implementation of the selected remedy.

Table 1
Total estimated cost for the selected remedy at the KHL-OU 3:

| Alternative | Total Capital Cost | Total O&M, per Yr. | Total Present Worth |
|---|---|---|---|
| 1 | $1.6 - $2.7 million | $125,000 | $3.2 - $4.3 million |

The selected remedy for the KHL-OU 3 And the five former lagoons are cost-effective because it provides the greatest overall effectiveness proportionate to its cost when compared to the other alternatives evaluated, the net present worth being $3.2 - $4.3 million. The estimated cost of the selected remedy is much lower than the cost of Alternatives 2 and 3, and assures a high degree of certainty that the remedy will be effective in the long-term due to the significant reduction of the mobility of the PCBs achieved through containment of the source material and the prevention of leachate generation.

4. Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

The selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be used in a cost-effective manner at the KHL-OU 3. Of those alternatives that are protective of human health and the environment and that comply with ARARs, the state of Michigan and the EPA have determined that the selected remedy provides the best balance in terms of long-term effectiveness and permanence, reduction of toxicity, mobility, or volume of contaminants, short-term effectiveness, implementability, and cost, taking into consideration state and community acceptance.

Consolidation of residuals outside the landfill into Cell 4 in addition to the installation and maintenance of a final cover for the landfill, groundwater monitoring, and restriction of access through installation of a fence and institutional controls, will provide the most permanent solution practicable, proportionate to cost.

5. Preference for Treatment as a Principal Element

Based on current information, the EPA and the State of Michigan believe that the selected remedy is protective of human health and the environment and utilizes permanent

solutions and alternative treatment technologies to the maximum extent possible. The remedy, however, does not satisfy the statutory preference for treatment of the hazardous substances present at the KHL-OU 3 as a principal element because such treatment was not found to be practical or cost-effective at the KHL-OU 3.

## K. SUMMARY

The selected remedy will satisfy the statutory requirements established in Section 121 of CERCLA, as amended by SARA, to protect human health and the environment, will comply with ARARs or provide grounds for invoking a waiver, and will use permanent solutions and alternate treatment technologies to the maximum extent practicable.

Treatment is not a component of the selected remedy because an attempt to treat the PCBs present at the KHL-OU 3 and the five former lagoons would not provide a sufficient significant additional decrease in risk presented by the KHL-OU 3 and the five former lagoons to justify the increased cost of attempting to incinerate the PCBs.

## L. RESPONSIVENESS SUMMARY

The public participation requirements of CERCLA sections 113 (k) (2) (i-v) and 117 of CERCLA have been met during the remedy selection process. Section 113 (k) (2) (i-v) and 117 of CERCLA require the state as the lead agency to respond "... to each of the significant comments, criticisms, and new data submitted in written or oral presentations" on a Proposed Plan for an RA. The Responsiveness Summary addresses the concerns expressed by the public, PRPs, and governmental bodies in written and oral comments received by the MDEQ regarding the Preferred alternative for the KHL-OU 3.

### OVERVIEW

At the time of the public comment period, the MDEQ as lead agency, in consultation with the EPA, the support agency, had proposed a preferred alternative for the KHL-OU 3 in the city of Kalamazoo, Michigan. The preferred alternative addressed the PCB-contaminated soils, sediments and residuals associated with the KHL. The preferred alternative specified in the ROD includes capping and containment of the KHL. Prior to construction of the cap, the excavation and on-site containment of PCB-contaminated soils, sediments and residuals from the landfill berms, Georgia-Pacific Corporation's five former lagoons, the adjacent river, and the KSSS floodplain, into Cell 4 of the KHL, will be conducted.

Judging from the comments received during the public comment period, the selected alternative was generally supported. The residents would prefer not to have a nonproductive zone (i.e., the closed landfill) in their community and their comments dealt with issues of the long-term effectiveness of the selected alternative. The PRPs would only support the selected alternative.

These sections follow:
Background on Community Involvement and Concerns
Summary of Comments Received During the Public Comment Period and the MDEQ's Responses
Attachment: Community Relations Activities at the KHL OU 3

## BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

Prior to the KHL being included in the site as a source area, community involvement was non-existent. Since the KHL became part of the site, the MDEQ has issued seven progress reports and hosted eleven public meetings during the scoping of the RI for the KHL-OU 3, the five former lagoons, and the site. During the public meetings the MDEQ provided background information on the KHL-OU 3 and the five former lagoons, explained the Superfund process, and provided details of the upcoming investigation. During July 1993, the MDEQ issued a fact sheet describing the RI work being conducted at the KHL-OU 3. All phases of the RI were completed by December 1996. The MDEQ issued other fact sheets and progress reports summarizing the results of the investigation. The MDEQ distributed a third fact sheet in June 1996 that described the dike stabilization project conducted as an interim action.

The EPA awarded a Technical Assistance Grant (TAG) for this site to the Kalamazoo River Protection Association (KRPA). The KRPA is a member of the Citizens Advisory Committee (CAC) established by the MDEQ. The MDEQ also established the Government Advisory Committee (GAC) comprised of all interested elected officials from local, state and federal governments. A list of meeting dates, attendees, and topics discussed at each meeting concerning the KHL-OU 3 can be found in Attachment 1 of this ROD.

Results of the RI were presented to the GAC/CAC on March 9, 1994. Results of the Risk Assessment and Focused Feasibility Study (FFS) were presented to the GAC/CAC on August 24, 1994. The results of the Cell 4 investigation performed in January 1995 were presented at GAC/CAC meetings in March 1995. Technical Memorandum 15, Mill Investigations, contains the results of the RI for the five former lagoons. This document was placed in the six information repositories listed in Table 2 in August 1996.

Fieldwork for the KHL-OU 3 RI got underway in July 1993. The MDEQ held nine meetings and issued eight progress reports/fact sheets detailing the RI work and the RI findings at the KHL-OU 3. The RI and FS reports were released to the public and placed in the six information repositories, listed in Table 2 , in July 1994 and in September 1994, respectively. The Proposed Plan was also released for public review in September 1994. The Administrative Record has been made available to the public at the Superfund Section of the MDEQ in Lansing, Michigan, and at the six information repositories established at the locations shown in Table 2.

In August 1994 the MDEQ approved the FFS report. The Proposed Plan for the KHL-OU 3 was released to the public for review in September 1994. These documents were made available to the public at the office of the Superfund Section, MDEQ, in Lansing, Michigan, and the information repositories.

TABLE 2

| | | |
|---|---|---|
| Allegan Public Library<br>180 South Sherwood<br>Allegan, Michigan<br>(616) 673-4625 | Charles Ransom Library<br>331 Hubbard Street<br>Plainwell, Michigan<br>(616) 685-8024 | Comstock Township Library*<br>6130 King Highway<br>Comstock, Michigan<br>(616) 345-0136 |
| Kalamazoo Public Library<br>316 South Rose<br>Kalamazoo, Michigan<br>(616) 342-9837 | Otsego District Library<br>219 South Farmer<br>Otsego, Michigan<br>(616) 694-9690 | Waldo Library<br>Western Michigan University<br>Kalamazoo, Michigan<br>(616) 387-5156 |

A public meeting was held on September 14, 1994 to discuss the FFS and the Proposed Plan. The meeting was attended by approximately 25 persons, including local residents and representatives of the PRPs. At the meeting, representatives from the MDEQ and the PRPs answered questions about the KHL-OU 3 and the remedial alternatives under consideration. Formal oral comments on the Proposed Plan were documented by a court reporter. A verbatim transcript of questions and answers and public comments during the public meeting has been placed in the information repositories and Administrative Record. Written comments were accepted at the meeting and by mail and were also included for placement in the information repositories.

The Proposed Plan was available for public comment from September 14, 1994 through November 14, 1994. Comments received during this public comment period were reviewed, and the MDEQ's responses are included in this Responsiveness Summary. Advertisements announcing the availability of the Proposed Plan and start of the public comment period were published in the *Kalamazoo Gazette, the Union Enterprise, Allegan County News & Gazette, Holland Sentinel, and the Kalamazoo Gazette-North.*

Responding to public comments and a request by the MDEQ for additional groundwater and Cell 4 data, the PRP's conducted additional limited RI sampling. In the meantime, the Mill investigation was completed and the five former lagoons were identified as an area in need of remediation. Because of the modifications made to the original preferred alternative, the MDEQ issued a Revised Proposed Plan on July 1, 1997. The public comment period was from July 1, 1997 through July 30, 1997. A Revised Proposed Plan meeting was held on July 16, 1997. Comments received during this public comment period were reviewed, and the MDEQ's responses are included in this Responsiveness Summary. Advertisements announcing the availability of the Proposed Plan, the Proposed Plan meeting, and start of the public comment period were published in the

* No longer an information repository for the site. It has been replaced by the Saugatuck-Douglas District Library, Center Street, Douglas, MI 49406, 616-857-8241.

*Kalamazoo Gazette, the Union Enterprise, Allegan County News & Gazette, Holland Sentinel, the Kalamazoo Gazette-North, and City Life (published by the Kalamazoo Gazette).*

## SUMMARY OF SIGNIFICANT COMMENTS

Many of the comments below have been paraphrased to effectively summarize them in this document. The reader is referred to the Administrative Record, located at the Information Repositories, which contains copies of all oral and written comments submitted to the MDEQ.

### Comment 1

Several commenters and the KRPA expressed concerns regarding the amount of time for review of the RI/FFS documents. Specific comments include: there should have been more time prior to the September 14 public meeting to review the documents; the time for providing comments on the Proposed Plan should be extended; and there should be another meeting to answer questions.

### Response 1

In response to the expressed concerns regarding the amount of time to review the RI/FFS documents and develop comments, and a specific request made during the public meeting on September 14, 1994, the public comment period was extended an additional 30 days to November 14, 1994.

Both the state and federal regulations require that the public be given opportunities to review and comment on proposed RAs. As stated in Part 201, Environmental Remediation, of the NREPA, Section 324.20120d, the public is encouraged to comment prior to MDEQ approval of a proposed plan for RA. In the CERCLA regulations [40 CFR 300.430(f)(3)(I)(C)], a minimum of 30 days is provided to review the Proposed Plan and supporting information.

Based on the MDEQ's experience in landfill remediations under the NREPA , the agency believes that a 60-day comment period in this case is sufficient to obtain complete public comments on the Proposed Plan. The MDEQ will continue to meet with the public regarding the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund site.

### Comment 2

Two commenters provided comments related to the future recreational use of the river in the area of the KHL. The expressed concerns were that Alternative 1 needs to be compatible with future recreational use, which may include the proposed river trail system and boating activities along the river. Specific comments included that Alternative 1 should not pose a physical danger to boaters and that related liabilities be

addressed, and that the remediated KHL-OU 3 should not pose a danger to future users of a river trail system.

**Response 2**

The post-closure plan for the KHL-OU 3 will necessarily include institutional controls such as access restrictions as required by Part 115, Solid Waste Management, and Part 201, Environmental Remediation, of the NREPA. Nevertheless, the implementation of Alternative 1 is not expected to prohibit the development of a trail in the area.

Alternative 1 is protective of human health and the environment. Protectiveness is provided by the NREPA cap, dike stabilization, consolidation of residuals, erosion control, long-term monitoring, and institutional controls. The landfill cap and institutional controls protect the public from exposure to PCBs contained in the landfill.

The steel sheet-pile wall was installed to stabilize the landfill dike. The design of this wall does not present a hazard to navigation.

The nature of liabilities for the owner of the landfill and users of the adjacent river is essentially the same as those that exist today or those that are associated with other private lands along the river.

**Comment 3**

Two commenters and the KRPA provided comments regarding the compliance of Alternative 1 with ARARs, questioning whether Alternative 1 complies with Acts 307 or 641. In addition, the commenter stated that "the interpretation of 40 CFR 761 is not satisfactory." The commenter claimed that the "standards" of Act 307 would not be met by Alternative 1 and that the alternative would "not meet the full construction requirements for full compliance with Act 641."

**Response 3**

During the FFS evaluation process, all three alternatives were assessed as to their compliance with federal and state ARARs. As noted in the text of the ROD, Part 115, Solid Waste Management of the NREPA (formerly Act 641) provides siting, construction, cap, monitoring and other requirements for certain Michigan landfills.

Because Cells 1 through 3 of the KHL were licensed prior to implementation of Part 115, the regulation's siting and construction requirements do not apply to these cells. Furthermore, MDEQ does not believe the siting and construction requirements are relevant and appropriate to the selected alternative. With regard to Cell 4, MDEQ does not generally require unlicensed landfills that are in the process of closing to comply with the siting and construction requirements of Part 115. MDEQ believes that such

requirements are neither applicable nor relevant and appropriate to the remedy selected for Cell 4 in this ROD.

It is important to note that the remedy selected in this ROD will comply with all of the closure requirements in Part 115. In other words, MDEQ determined that the capping and closure requirements of Part 115 were either applicable or relevant and appropriate to this selected remedy.

Part 201, Environmental Remediation, of the NREPA (which supersedes Act 307) requires the cleanup of sites to levels which, based upon considerations of future land use, do not present a risk to human health or the environment. Limited Industrial criteria apply because the KHL area is, and will continue to be, restricted to industrial land uses under local zoning ordinances. Based upon analyses contained in the site-specific RA for the KHL-OU 3 and the FFS, Alternative 1 will put controls in place so the KHL-OU 3 will not present a risk to human health or the environment. Therefore, Alternative 1 meets Limited Industrial criteria and complies with
Part 201, Environmental Remediation, of the NREPA.

The following provides additional information regarding the interpretation of 40 CFR 761 with respect to Alternative 1 as presented in the FFS. The regulations developed under the TSCA, which govern the disposal of PCB, are presented in 40 CFR 761. Subpart D - Storage and Disposal of 40 CFR 761 begins with this note:

> "This subpart does not require removal of PCB and PCB Items from service and disposal earlier than would normally be the case. However, when PCB and PCB Items are removed from service and disposed of, disposal must be undertaken in accordance with these regulations. PCB (including soil and debris) and PCB Items which have been placed in a disposal site are considered to be 'in service' for purposes of the applicability of this subpart. This subpart does not require PCB and PCB Items landfilled prior to February 17, 1978 to be removed for disposal. . . ."

The description of the history of disposal of residuals that contained PCB concentrations 50 ppm or greater as presented in the FFS, together with the wide experience base in applying this "pre-1978" exemption to landfill sites, support the interpretation that 40 CFR 761 is not an ARAR. This would apply to the PCB-contaminated materials that are capped and contained in-place.

Although the EPA agreed that TSCA was not an ARAR for the proposed plan, the subsequent decision to consolidate residuals from the five former lagoons near the landfill into Cell 4 resulted in TSCA becoming an ARAR. The TSCA disposal regulations at 40 CFR Section 761.60 et seq. are applicable to PCBs at concentrations of 50 ppm or greater when such PCBs are "taken out of service". Under the RAs being considered, TSCA disposal regulations could be triggered by excavation of PCB-contaminated soils, and residuals from the five former lagoons. These materials will be consolidated into Cell 4. Pursuant to 40 CFR Section 761.60 (a) (4), PCBs must be disposed of : "(i) in an

incinerator which complies with 761.70; or (ii) in a chemical waste landfill which complies with 761.75." The TSCA compliant chemical waste landfill disposal method is generally much less expensive than incineration.

The on-site consolidation and containment of PCBs, whether from sediments, soils, or residuals excavated from the five former lagoons will be placed in Cell 4. Cell 4, being an existing landfill cell does not possess the following chemical waste landfill requirements found in Section 761.75 (b):

- Bottom liner requirements (the landfill does not have a bottom liner) (761.75 (b) (1) and (2))
- Fifty foot distance between bottom liner and historical high water table (761.75 (b)(3))
- Leachate collection requirements (761.75 (b)(7))

Pursuant to 761.75 (c) (4), the EPA Regional Administrator has determined that one or more of the requirements in 761.75 (b) is not necessary to protect against unreasonable risk of injury to health or the environment from PCBs and may waive such requirements. In this ROD , the EPA Regional Administrator waives the requirements in 761.75 (b) (1), (2), (3) and (7) for the following reasons:

1. The final RA will provide protection to human health and the environment against unreasonable risks of injury.
2. No significant reduction in the long-term risks would be gained from off-site disposal of the small quantity of PCBs in excavated residuals, sediments, and soils because the bulk of the PCBs will be contained in place under the final cover.

**Comment 4**

A number of commenters and the KRPA expressed preferences for treatment of the PCB-containing residuals. For several commenters, this was at least part of their basis for stating opposition to Alternative 1 and support for alternatives that include removal. For other commenters, this preference was communicated as part of their support of Alternative 1 in a recommendation that provisions be made to allow for future treatment of the residuals at such time as "technology becomes available to treat the affected residuals," "in a reasonable and safe manner." One commenter recommended the siting of an incinerator central to all of the OUs to treat not only KHL-OU 3 residuals, but those from other OUs as well. A related comment offered by one commenter is that Alternative 1 does not address complete reduction of mobility and toxicity.

**Response 4**

The essential requirement of remediation is that it be protective of human health and the environment. Alternative 1 satisfies that requirement and has greater short-term

effectiveness than Alternative 3, which includes treatment. The greater short-term effectiveness is due to the shorter schedule for completion of Alternative 1 as compared to Alternative 3 and the fewer short-term negative human health and environmental risks associated with excavation, transport, and treatment. In addition, Alternative 1 is more implementable and less costly than
Alternative 3.

The siting of a central incineration facility might in theory reduce the unit costs of incinerating KHL-OU residuals. The reduction in costs relative to on-site incineration, if any, (costs for transportation of residuals both to and from the facility would need to be evaluated) would not sufficiently compensate for the predictable decrease in implementability that would accompany configuration of such an alternative. It is doubtful that such an alternative would be preferable to on-site incineration.

The potential for future treatment after implementation of Alternative 1 exists in the five-year review provision of CERCLA Section 121(c). The EPA will conduct a review of site conditions every five years. If, after reviewing site conditions, a significant risk were found as a result of failure of the remedy to be protective, the remedy will be reconsidered. At such time, the availability of cost-effective treatment technology could be further evaluated. It is important to note that treatment will not need to be considered if the remedy is working as designed.

The implementation of Alternative 1 will provide a reduction in the potential mobility of the residuals by cap placement, dike stability, and erosion control. Cap placement will minimize the potential for PCB migration via dust generation, surface water runoff, and groundwater flow. Dike stabilization and erosion control measures will minimize the potential for dike erosion or failure, thereby reducing the potential migration of PCB-containing residuals to both the site and the Kalamazoo River.

**Comment 5**

Two commenters and the KRPA stated that Cell 4 should be included in the remediation.

**Response 5**

Cell 4 will be included in the remediation as described earlier. The FFS stated that additional information was needed to determine the appropriate action for Cell 4. After a comprehensive probing and sampling investigation of Cell 4 in January 19[illegible], remedial alternatives specific to Cell 4 were evaluated. The MDEQ concluded that of the four alternatives (i.e., no action; containment under a cap similar to that selected for Cells 1, 2, and 3; on-site disposal in Cells 1, 2, and 3; or off-site treatment and disposal), containment under Part 115, Solid Waste Management, of the NREPA Type III cap (which includes an impermeable liner) best achieves all criteria required by state and federal guidelines. An important consideration in the selection process was additional data that indicate Cell 4 residuals are similar in many respects to residuals contained in

Cells 1, 2, and 3. These residuals reside at the same elevation, have similar PCB concentrations, are composed of the same materials, have the same physical properties and originated from the same production process.

**Comment 6**

A number of commenters and the KRPA expressed concerns regarding the long-term effectiveness of Alternative 1. One commenter stated that there must be responses to any future release of PCB from the KHL-OU 3 if detected by long-term monitoring. Another commenter believed the issue of infiltration of groundwater beneath the KHL-OU 3 would not be adequately addressed by Alternative 1. One commenter stated that construction materials that would last more than 30 years should be selected, while another commented that the selected materials should last 500 years. One commenter suggested the construction of a "steel sea wall" to provide long-term protection of the dike. One commenter questioned if a steel retaining wall had a long enough life expectancy. Another questioned why only 30 years was used to address monitoring, and expressed the need for financial assurances for future work at the KHL-OU.

Other comments related to the long-term effectiveness of Alternative 1 included questions and statements regarding the potential future impacts of river meander and rare flood events.

**Response 6**

It was concluded in the FFS that Alternative 1 will be effective over the long-term. According to the requirements of the NCP, the three alternatives were evaluated using two threshold criteria and five primary criteria. Long-term effectiveness and permanence was one of the five primary criteria, and it was concluded that Alternative 1 will provide for long-term effectiveness and permanence. Long-term monitoring and maintenance of the KHL-OU 3, including the structures used to isolate residuals and PCB from human contact and the river, are necessary components of Alternative 1 to assure long-term effectiveness. As part of the post-closure plan for the permitted landfill, a monitoring program will be established and approved by the MDEQ.

Monitoring and maintenance activities will proceed for an indefinite period of time to assure long-term effectiveness. The 30-year duration of monitoring and maintenance activities employed in the FFS for cost-estimating purposes was selected to be consistent with EPA guidance. EPA guidance for FS states that "In general, the period of performance for costing purposes should not exceed 30 years for the purposes of the detailed analysis."

With respect to financial assurances, as required under the current Parts 201 and 115 of the NREPA Landfill operating permit for the KHL, a Perpetual Care Fund will be established and maintained to be used exclusively for closure, monitoring, and

maintenance of the landfill and for response activities necessitated by a discharge from the facility.

Ongoing monitoring in conjunction with the five-year review provision of CERCLA will provide the necessary technical, legal, and administrative tools necessary to detect and respond to conditions to assure the long-term protectiveness of human health and the environment from PCBs at the KHL-OU.

The design of Alternative 1 will consider the future forces of the river and how changes in upstream conditions could affect the long-term effectiveness of the alternative. Specifically, the dike stabilization measures will be designed to withstand the erosive forces of extreme high-flow events. In addition, changes in upstream land use and structures that could affect the stability of the containment system at the KHL will be monitored. The incorporation of such monitoring in Alternative 1 was in response to a similar comment from the public made on August 24, 1994.

In December 1996 the construction of a steel sheet-pile wall along 900 feet of the dike that separates Cells 1, 2, and 3 from the Kalamazoo River was completed. The work extends the existing 120 feet of retaining wall installed in 1994 after a storm uprooted trees on the dike. The FFS reviewed two options for stabilizing the dike: placing rock-filled wire baskets called gabions, or installing steel sheet pilings. Although gabions were originally proposed, the steel sheet piling has now been selected and installed because of its site-specific advantages over gabions. For example, based upon the small repair project in 1994, there is a greater degree of confidence that the sheet piling could be properly constructed and result in fewer construction impacts on the river than gabions. By extending the retaining wall two feet above the 100-year flood elevation, the sheet pile will prevent surface water runoff from eroding soils into the river and will protect the dike and KHL-OU from severe flood events.

**Comment 7**

Three commenters stated their support of Alternative 1. One of the commenters provided unqualified support noting that it: "is the lowest cost while protecting the environment;" "doesn't increase short term risk of PCB escaping by disturbing the site;" and "can be completed more quickly than Alternatives 2 and 3." A second commenter, in agreeing that Alternative 1 "is the most desirable at this time," also expressed a preference to see the "site cleaned up" but that he "understand[s] the ramifications of disturbance and incineration, and cannot really see just moving the contaminants to another site." The third commenter noted support of "this remedy as an interim solution."

**Response 7**

The MDEQ acknowledges these comments.

**Comment 8**

One commenter asked a question about how the remediation contract would be awarded and expressed concerns regarding the quality of remediation if the contract simply went to the lowest bidder.

**Response 8**

Although it remains to be determined exactly how contracting would proceed, performance-based contract specifications and a construction quality assurance program are prominent and necessary features of remedial contracting. Contractor qualifications and experience, the reliability of the contractor's proposed approach to meet the performance specifications, and costs are all important considerations in contractor selection. Note also that the AOC requires the MDEQ's review of contractor qualifications and the MDEQ's oversight of all aspects of the remediation to ensure the remedy is constructed as designed.

**Comment 9**

One commenter and the KRPA requested another round of groundwater sampling because the quantitation limit for the analyses of the RI samples (1 µg/L) was higher than the recommended PCB detection limit presented in MDEQ guidance.

**Response 9**

In response to this comment, an additional round of groundwater sampling was performed in August 1995. PCBs were not detected in any of the groundwater samples at a detection limit of 0.2 µg/L. Also, it should be noted that the compliance groundwater monitoring program required by the landfill's operating permit has collected several years of data at or below the MDEQ Target Detection Limit of 0.2 µg/L. PCBs were not detected in any of these samples.

**Comment 10**

One commenter claimed that the incineration costs presented in Alternative 3 were substantially overestimated since fuel costs would be lower because of greater British Thermal Unit (BTU) value of residuals. It was claimed that as a result, incineration costs should be only half of those presented in the FFS.

**Response 10**

As part of the alternatives evaluated in the FFS, Alternative 3 indicated costs associated with on-site and off-site incineration. Vendors offering on-site incineration and off-site incineration services that were contacted during the FFS for cost information noted that costs for incineration would not likely change based upon any further consideration of the BTU value of the residuals. Based upon the analysis of the costs of hazardous waste incineration projects, the reason that total costs are insensitive to the BTU value is that fuel costs are not a relatively large cost component of hazardous waste incineration projects.

**Comment 11**

Two commenters expressed concern regarding the precedent set by Alternative 1 for the KHL-OU 3 with respect to containment remedies at other portions of the site.

**Response 11**

The individual OUs and the site will be investigated and evaluated separately, consistent with the Consent Order between the MDEQ and the PRPs, and consistent with CERCLA and Part 201, Environmental Remediation, of the NREPA.

**Comment 12**

A number of commenters and the KRPA expressed concern about the use of the Part 201, Environmental Remediation unrestricted residential cleanup criteria for PCBs of 2.3 ppm being used for the KSSS floodplain soils. Their concern was twofold. The first concern was that the unrestricted residential cleanup criteria for PCBs of 2 3 ppm is based on human health and not on ecological receptors such as mink. The second was that this may set precedent for the cleanup of the Kalamazoo River, Portage Creek and their wetlands/ floodplains. The commenters recommended that the cleanup criteria be set at 0.33 ppm for sediments to protect the environment. The comments pointed out that this is the cleanup number that the Surface Water Quality Division (SWQD) of the MDEQ has recommended at other sites for the cleanup of PCBs in sediments.

Commenters also indicated that using visual criteria for consolidating residuals back into the landfill from the Kalamazoo River was not appropriate because some of the sediments in the river that are contaminated do not have the gray clay appearance.

**Response 12**

The Part 201, Environmental Remediation, unrestricted residential cleanup criteria for PCBs is now 1.0 ppm and not the previously level of 2.3 ppm that was listed in the

Revised Proposed Plan. The change in this criteria is due to the change in the percent absorption factor from 1 percent to 14 percent. This factor is used by both the MDEQ and the EPA. The MDEQ recognizes that the Part 201, Environmental Remediation, unrestricted residential cleanup criteria for PCBs of 1.0 ppm is based on risk assessment for the protection of human health. However, the MDEQ believes that this limited action on soils using the soil criteria is appropriate and will be protective of human health and the environment. The focus of the remedial action to consolidate the residuals back into the KHL from the KSSS floodplain and the Kalamazoo River immediately adjacent to the KHL is very limited and addresses a very small amount of residuals situated next to the KHL. This action would consolidate these residuals back into the KHL from which they originated and prevent them from eroding into the Kalamazoo River where it has the potential to cause a human health and environmental impact.

This cleanup action is focused on the KHL-OU 3 and not on remediating the Kalamazoo River or it's floodplains. These areas will be addressed by other RODs. Because the focus of this ROD is the remediation of the KHL-OU 3 and the five former lagoons and not remediating the river or floodplains, except in this limited area, it will not set precedent for the cleanup of these areas. If the ROD for the Kalamazoo River sets more restrictive cleanup numbers, for the river sediments and floodplain soils, the river and floodplain area will be re-evaluated to determine if additional actions are necessary.

Commenters are correct in stating that sediments can be contaminated with PCBs and may not show any visual criteria. The MDEQ acknowledges this fact. Once again the purpose of this ROD is not to conduct a river cleanup but a consolidation of residuals back into the KHL for the purpose of remediating the KHL-OU 3. This action will remediate only residuals that are in the river. Once the RI/FS for the river is completed and a ROD for the river sets the cleanup criteria for river sediments, the sediments along the KHL-OU 3 will be re-evaluated to determine if additional actions are necessary.

**Comment 13**

The KRPA expressed concern that the five former lagoons would only be remediated down to a PCB cleanup level of 21 ppm.

**Response 13**

The Part 201, Environmental Remediation limited industrial cleanup criteria for PCBs is 21 ppm. The land that contains the five former lagoons is zoned industrial and, therefore, it is appropriate to apply the limited industrial cleanup criteria.

**Comment 14**

Two commenters and the KRPA expressed a concern that the remediation of the KHL-OU 3 would destroy critical habitat for wildlife along the Kalamazoo River. The shoreline area of the river acts as a important corridor for wildlife. They requested that a

green zone be provided along the edge of the river to restore some of the habitat lost by the construction of the remedy. Another suggestion was to move the edge of the landfill back from the river to provide a important wildlife corridor.

**Response 14**

The MDEQ and the Michigan Department of Nature Resources are discussing with the PRPs the use of plants that would provide both habitat and a green zone at the KHL-OU 3 as part of the remedy. This issue will be investigated in the Remedial Design for the remedy.

**Comment 15**

One commenter and the KRPA asked for a 30-day extension of the public comment period for the Revised Proposed Plan.

**Response 15**

After careful review of the small amount of modification to the preferred alternative presented in the original Proposed Plan the MDEQ determined that the 30-day time extension for public comment was not warranted. The request was denied.

**Comment 16**

The KRPA opposes the TSCA waiver in favor of the total removal of the PCB-contaminated waste from the KHL-OU 3.

**Response 16**

The TSCA waiver applies to the removal of 3,000 cubic yards of PCB-contaminated residuals and soils from the five former lagoons and its disposal into Cell 4 of the KHL-OU 3. If the five former lagoons were not being remediated by this action the TSCA waiver would not be necessary. However, the addition of this material into the KHL-OU 3 prior to construction of the cap will not cause any problems. The materials being removed from the five former lagoons are identical to the materials already in the KHL-OU 3, with one exception, the concentrations of PCBs are lower. The review of the preferred alternative indicates that it is not necessary to require a bottom liner, a leachate collection system or the 50 foot separation distance between the waste and the top of the high groundwater table at the KHL-OU 3. These requirements all focus on resolving a groundwater contamination problem. The KHL-OU 3 does not have a groundwater contamination problem to resolve. No PCBs have ever been detected in the groundwater under the KHL-OU 3. By singing this ROD, the EPA Regional Administrator will have determined that these three requirements are not necessary to protect human health and the environment against unreasonable risk or injury.

Attachment 1
Community Relations Activities for the KHL-OU 3 of the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site

Community relations activities conducted at the KHL-OU 3 have included:

December 5, 1990 Pre-meeting With Local Officials

A meeting was held with local elected officials prior to the general public meeting on the scoping of the RI. The site history, Superfund process, RI, and the TAG were discussed.

December 12, 1990 Public Information Meeting

The start of the scoping process for the RI was announced. Held in the city of Kalamazoo, this meeting provided information about the site history, the Superfund process, the RI, and the TAG. It was also the first meeting since the site was placed on the NPL.

March 19, 1991 Public Information Meeting

Attendees included two neighborhood organizations from the city of Kalamazoo. Site history, RI scoping, the Superfund process, the AOC and risk assessments were discussed.

January 15, 1992 Public Information Meeting

Progress on the development of the RI/FS work plan and site status were presented at the meeting held in the city of Allegan. The KRPA discussed the TAG.

December 2, 1992 Meeting with the KRPA

TAG responsibilities and the KRPA's role in the Superfund process and the community were discussed at the meeting. Scoping for the RI was also discussed.

January 13, 1993 First GAC Meeting

Twenty participants from local governments were present at the meeting held in the city council chambers in the city of Plainwell. The January 1993 Site Problem Statement was distributed and discussed and Progress Report #5 concerning the RI was reviewed.

February 17, 1993 Public Information Meeting

A progress report on the work plan development for the RI was presented. The project managers explained the Superfund process and discussed the OU work plan. A brief overview of the Portage Creek/Kalamazoo River work plan was also presented.

February 23, 1993 GAC Meeting #2

The MDEQ and GAC members discussed OU work plans at the meeting held at the Parchment City Hall.

March 3, 1993 Public Information Meeting

A progress report on the RI was presented at the meeting which was held in the city of Allegan. Project managers presented an explanation of the Superfund process and discussed the Portage Creek/Kalamazoo River work plan development. A brief overview of the OU work plan was also presented.

March 18, 1993 First CAC Meeting

The project managers presented a description of the Superfund process, an overview of the work plan development, and other site information. The KRPA was introduced to the public. There was a presentation on the Area of Concern program, a program administered by the SWQD that addresses a variety of issues related to the river basin. The meeting was held at the Plainwell Comfort Inn in the city of Plainwell.

November 3, 1993 CAC Meeting #4

The MDEQ discussed the Superfund process and gave a progress report and update on the KHL-OU 3 and the site RI. The schedule for submittal of draft documents to the MDEQ was distributed and discussed. The meeting was held at the Plainwell Comfort Inn in Plainwell.

November 3, 1993 GAC Meeting #6

The MDEQ discussed the Superfund process and gave a progress report and update on the KHL-OU 3 and the site RI. The schedule for submittal of draft documents to the MDEQ was distributed and discussed. The meeting was held at the Plainwell Comfort Inn in Plainwell.

November 18, 1993 Presentation to the Kalamazoo Environmental Council

The MDEQ presented the Superfund process, updated site progress, and gave an overview RI/FS. Future expectations related to the RI were also discussed.

December 8, 1993 Public Information Meeting-Progress Update

The MDEQ provided an overview of the Superfund program and an update on the progress being made in the KHL-OU 3 and site RI. Additional comments were provided

by the KRPA. Approximately 40 people attended the meeting, which was held at the Comfort Inn in Plainwell.

March 5, 1994 GAC Meeting #8, CAC Meeting #6

The results from the RI of the KHL contained in Technical Memorandum #6, King Highway Landfill Operable Unit, were presented and a project update was provided. The meetings were held at the Comfort Inn in Plainwell.

August 24, 1994 Combined GAC & CAC Meeting

A presentation on the FFS for the KHL was given to the CAC and elected officials. Meetings were held at the Comfort Inn in Plainwell.

September 14, 1994 Proposed Plan Public Meeting

The King Highway Proposed Plan public meeting was held at the High School in Comstock.

March 8, 1995 Combined GAC and CAC Meeting

The KHL-OU 3 was discussed, as well as additional RI work and the ongoing PRP search.

# Figure 1 - King Highway Landfill Operable Unit